THE NATIONAL GEOGRAPHIC MAGAZINE

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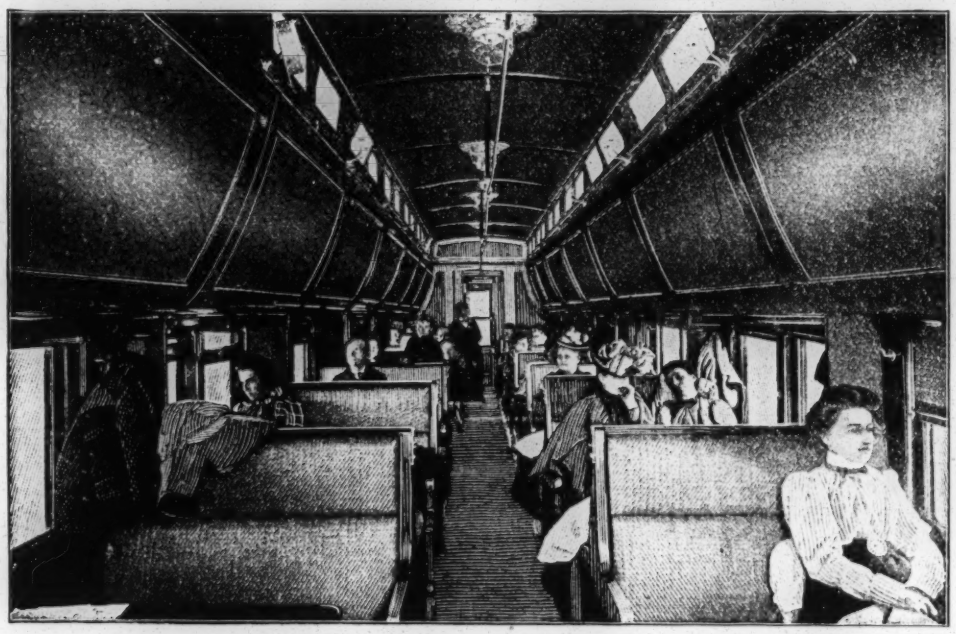

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VOL. XII, No. 3 WASHINGTON MARCH, 1901

THE NATIONAL GEOGRAPHIC MAGAZINE

ABYSSINIA—THE COUNTRY AND PEOPLE

BY OSCAR T. CROSBY

ON leaving Paris in December, 1899, I went first to Constantinople, as I wished to journey across the interior of Turkey down the Mesopotamian Valley; but on my arrival at Constantinople our representatives at the American legation informed me that not less than thirty days would be required for obtaining permission to go into the interior. Passports to the great sea-coast towns of Turkey are had as readily as those for any European city, but the Ottoman Government is unwilling that travelers should penetrate into the rather loosely governed portions of Asia Minor unless provided with other special letters insuring as far as possible the safety of the bearer. The necessary delay being greater than I cared to make, I left Constantinople for Cairo.

The Austrian captain of the Egyptian vessel piloted us for five days across the Mediterranean without making any astronomical observations whatever.

Arrived at Cairo, a fortunate chance gave me acquaintance with Sir Rennell Rodd, Secretary of the British Agency, which means, substantially, Secretary of the Egyptian Government in Cairo. This gentleman had made the journey to Addis Abeba a few years ago at the head of a mission whose object was to cultivate the friendship of and obtain treaty with the African monarch. From Sir Rennell I obtained the first detailed information as to how I might get into Abyssinia, and through the kindness of other British officers stationed at the arsenal I was enabled to buy a few rifles and some ammunition. The sale of fire-arms generally is strictly controlled in Cairo, as it is in most oriental countries.

In Cairo, too, I was able to have packed in wooden cases a stock of excellent provisions, the selection of which was largely suggested to me by the provision merchants who had supplied several of the Nile expeditions of troops. An example, however, of the importance of detailed knowledge was given me when, on getting into the interior and being required to use the small Abyssinian mule for transport, I found it necessary to cut down these boxes, which in Cairo were supposed to be quite the right size, and which had been satisfactory enough on camels, and probably would have

been satisfactory enough on a full-sized mule.

Here, also, through the kindness of the American mission, I acquired a very doubtful asset in the person of a shop-worn, old Abyssinian, who had left his native land as a boy and had been too much cared for by a succession of missionary friends, who had brought him up into a softened old manhood. His qualifications were honesty, a knowledge of the two principal Abyssinian tongues, together with sufficient English to keep me from going mad; and a helplessness which assured his fidelity to me when we were in strange lands.

With about twenty boxes of provisions and the ancient Michael Gabriel, I took ship at Port Said on a tramp vessel bound for Aden. Until the comparatively recent establishment of Jibuti, in French Somali Land, Aden was the only seaport near this portion of the African coast which one could reach by steam vessels plying to or through the southern end of the Red Sea.

It would have been possible to take an Italian ship for Massawa, and to begin there the journey toward the interior, but I was told, and could well understand, that the sad disasters suffered by the Italians in recent years had reduced Massawa to a point of almost negligible importance, and, moreover, there I would have had more difficulty in obtaining the necessary consent from Menelek for the interior journey than at Jibuti or Zeila.

Aden is famous the world over as one of the hottest and in all natural ways one of the most detestable places frequented by civilized man. My first day or two at this point, housed in one of the two strange little inns which the traveler may find, quite bore out the popular conception of the place; but soon acquaintance with the hospitable British officers made the place seem to me quite a pleasure resort. I saw then, more clearly than in Cairo, which is now quite European, the splendid talent of our British cousins for making themselves and their guests almost comfortable and entirely contented in all sorts of conditions.

A score of forgotten, but at the last moment much desired, articles were obtained, and all the purchases were found in good condition when I arrived in Zeila save only that the sea biscuit, which I had ordered to serve as bread, had been forgotten by the packers. The result was the important discovery that one can get along tolerably well without bread.

A little steamer coughs its way across once a week from Aden to Berbera, thence to Zeila, thence back again. On this Michael Gabriel was sent a week ahead with instructions to deliver a letter to Captain Harold, the British officer in command at Zeila, and, with his permission, to get together some camels.

When I reached Zeila, Michael seemed to have gotten close to only one camel. That one had managed, even with its soft pad, to kick Michael's shin into collapse and make him mourn the difference, which he declared to be well marked, between the Somali camels and his humped brother of Asia Minor and Egypt.

A few Somali servants had been engaged in Aden, one of whom tried to desert when the little ship stopped at Berbera, but we were finally landed safely, carried in chairs on the shoulders of strong, young natives through the shallows to the shore. Zeila is a seaport, not a harbor.

Captain Harold put me up at his modest Presidency, and his kindness followed me at every moment in all the detailed organization of the caravan. A trade with camel men was made at so much a load for the distance from Zeila to Gildessa. Additional and trustworthy men were engaged for my personal services, and happily two small mules, the only two in Zeila, were sold to me as saddle animals for myself and companion.

As I had a very natural desire to see French Somali Land, I went over in a day's sail in a native boat from Zeila to Jibuti. This seaport is not more than ten years old, has about eight thousand inhabitants, loyal natives, and is already rather neatly built—a low-roofed, white, tropical French town with a good harbor. Ships of the M. M. line stop about twice a month, and, more than all, as to its future importance, it is the starting point of a railway which French capital has pushed to the interior. A year ago the work was completed for a distance of forty miles, with considerable preparatory grading for some distance ahead. The workmen must be guarded at all times by soldiers, who are for the most part from the west coast of Africa. There is an occasional outbreak; a few Italian or Arab laborers are killed by a rush at night; yet through it all the patient stockholders in Paris are backing up the efforts of their representatives, who are building a railway that may be small, indeed, in commercial value, but, on the other hand, may have a very large political significance. At least it may be said that this railway enterprise does very much to offset what would otherwise be the preponderating influence of Great Britain upon the future Abyssinian question, due to the large British possessions which almost surround Menelek's domain.

I found in Jibuti that arms were sold in very large numbers, and indeed all caravans which I saw starting for the interior during three or four days' stay bore boxes marked "*cartouches*." Nearly all imports to Abyssinia other than arms go by way of Zeila.

Having finally chaffered myself into the ownership of a third mule, I started back to Zeila, across the desert, accompanied by a follower who had walked across a night or two before. There was really no great danger, since the whole coast is under the power either of the French or English, but a white man without arms is not thoroughly understood by the natives, and the killing of any man in any manner reflects great credit upon the slayer. Indeed, it was feared that a weaponless white man might be considered as a derelict which could not be put to better use than by a kind of innocent slaughter, quite without personal animus. However that may be, I got across the desert, a distance of forty miles, in about eight hours of very hot riding, relieved by a very splendid mirage effect on approaching Zeila, whose low dingy houses became a glittering row of splendid white palaces.

Finally sixteen camels, with proper loads, were gathered, a well-defined bargain was made for their hire, and we drifted out upon the desert, camping only eight miles from Zeila the first evening. Here the sweet silence of the desert fell upon us, broken only by the chatter of men and grunt of camels; then the night finds its true voice, the complaining cry of the hyena. Subsequently in the long march one day was very much like another, so far as the movement of the caravan was concerned. Little difference was made even by changing transport to mules, for with either animal the average journey, when not carrying food, must be in the neighborhood of twelve miles a day.

The African camel starts out on such a journey with no stored-up fat, and he must have a few hours a day in which to nibble at the thorn bushes, which are found almost everywhere in this east shore desert. The mule cannot subsist on thorn bush; hence he is not used in this region, but in the grassy country he must have a few hours for grazing, so that substantially the day's march averages not more than five hours.

When it comes to mountain-climbing the camel is very inefficient, and is rarely used. The little barefooted mule, native to Abyssinia, is the only and very excellent means of transportation. He carries about 120 pounds weight, and con-

tinues to carry it when his back and side have become lacerated to a most sickening degree. These mules are bought at the average price in our money of $25, and horses for about half that sum. They can be more readily had for purchase when one has reached the Abyssinian country than camels can be had in Somali Land.

At Harar the donkeys and camels are dropped and the mule, whose services thereafter are almost universal throughout Abyssinia, comes into use. For the journey to Addis Abeba a mule caravan of twenty-five mules can be gotten together in the course of a week at Harar, if one is very industrious, but it would be impossible, apparently, to get any one man to contract for twenty-five mule loads. There were in my small caravan of twenty animals six independent owners. Fortunately they all have pretty nearly the same habits and this constitutes the only bond between them.

Having become after the first ten days' march from Harar quite desperate on account of daily disputes as to where we should camp, I insisted upon the appointment of one spokesman with whom I might deal every evening in determining the following day's march. All solemnly agreed to stand by such decision as their chosen spokesman and myself might reach, and they held to the agreement for just two days. I learned, however, that they were not altogether a vicious lot; they were merely stubborn children, so far as conduct was concerned, and, moreover, in respect to the marches which the mules could stand, were much wiser than I.

My agreement was that I should be landed in Addis Abeba in twenty-five days from the start at Harar, and after all my vexations they carried out that part of the contract. Two-thirds of the contract price was paid at the beginning of the journey, the remainder in Addis Abeba. They all expect something in the way of *backsheesh*, and those who had been most troublesome were, of course, most importunate.

In pushing beyond Addis Abeba it was impossible to get a hired caravan, as there is no such regular means of conveyance. I was able, however, after a twelve days' stop, to purchase seventeen mules; but this was by happy chance, due to the fact that Colonel Harrington, the British diplomatic agent, had thirteen of these mules already in hand, left in his care by some English traveler who had passed through eight or ten months before. Here also, hoping to find the horse a little more variable in his paces than the mule, I bought two, one for my assistant and one for myself. It was a relief as compared with the slow dog trot of the mule; but in the exceedingly rough marching which had to be accomplished on reaching the Blue Nile, the horses soon played out. One of them had to be shot, and the other was turned into the caravan and bore about half a load.

The camel men from Zeila and the Somali, whom I had engaged as personal attendants, were all Mohammedans.

The mule men from Harar to Addis Abeba were Abyssinians, but of mixed faith, there still being a considerable Mohammedan element in southern Abyssinia, due to a great invasion which took place two or three hundred years ago under a leader who was doubtless of Arabian family and whose first followers were the Mohammedanized Somali. Many Galla, who constitute one of the most widely distributed people in northeast Africa, were also converted and many have been permitted by their present rulers, the Abyssinians, to retain their faith.

From Addis Abeba on to the Sudan my followers were of Abyssinian Christian creed, with only four or five Mohammedans, these being the Somali who accompanied me from the coast throughout the journey. Although they could not eat of the same food, there was not

a great deal of friction between the two tribes. On several occasions, when I was lucky enough to shoot a deer, a Somali and an Abyssinian would enter a good-natured foot race, each with drawn knife, the winner being able to give the finishing cut-throat blow to the animal and thus obtain for his companions fresh meat which the others would not deign to touch.

The mule caravan was used to carry me through all the known and unknown country from Addis Abeba northwesterly to Famaka, on the Blue Nile, where at last a white face was seen again—that of one of those solitary young English officers who may be found in so many faraway spots doing the empire's hardest work. At Famaka the caravan was dismissed, the men returned to Abyssinia, and the rest of the journey to Khartum performed in a native boat, which was rowed and pushed down the river 450 miles in thirteen days.

The country which I traversed may be divided, so far as physical characteristics are concerned, into three parts:

First, the Somali desert lands, extending from the coast to the neighborhood of Gildessa. In this region water is to be had only by digging holes in the sand, some of which remain in a tolerably permanent condition, so that it may not be necessary for each caravan to freshly scoop the day's supply. In other places the natives have learned from experience that in the dry river beds water can be found from one to six feet below the surface, and the position of the camp is determined accordingly. The men refused to use the spade and shovel which I had carefully provided, and scooped a hole with their hands, and in the course of five or ten minutes the bottom of the hole would fill with trickling water, quite brown with sand but otherwise good.

In this region a hot night follows a hotter day; yet there is a sort of cleanliness due to the lack of moisture, and one feels less than might be supposed the absence of water for bathing purposes. Indeed, on several occasions I learned by experience that Mohammed was speaking merely the ordinary practice of his desert-dwelling people when he prescribed the use of sand as a substitute for water in the execution of those ablutions which his creed orders as a part of religious duty. The desert is not entirely of sand. Sometimes it is rather sandy than sand, and in such cases it is generally widely covered with large and small volcanic stones. It is a land of desolation, but a land of peace, and few who have seen it but would gladly go there again for rest.

The next region, the great Abyssinian plateau, shows rather barrenly in spots, but for the most part is a tolerably well-watered and pleasing country. There are wide, rolling prairies, which show brown toward the end of the dry season, but are green during the rainy season and the earlier part of the dry. Splendid trees are found on some of the mountain sides and elsewhere in isolated groups, but, generally speaking, there is a sad dearth of forest growth.

After the exceedingly arduous work of climbing up the sides of this great escarpment, one may travel for many days over easy country. It is this great plateau which the Abyssinian have held against all comers for so many centuries, and now that they have the rifle it will be a bloody task for men who would dislodge their power over it.

This great region is cut deeply in two by the Blue Nile, whose waters run in a chasm five thousand feet below the plains, where I first crossed it, and about the same level at the two other points where I was able to descend to it. It was this upper Nile region and the region lying at the foot of the westernmost escarpment along the Blue Nile which had not heretofore been visited by white men. The descents were made chiefly on foot and were very difficult.

The third region is that into which one descends in the neighborhood of Wombera, and where one finds, after a very few days' march from the foot of the mountains, the beginning of the characteristic Nile scenery. The country is flat, covered for the most part where neglected, with the mimosa, which here grows to a considerable height, although it is a very near relative of the stunted thorn bush, familiar on the Somali plains. The palm, however, and a number of other good wide-spreading trees of the fig family appear to relieve the ugliness of tree-life. I shall not be able now to describe in any detail the splendid physical features which impress one on passing over the great plateau and in crossing the Nile, the Tchencha, the Bolassa, and other inflowing streams.

It will be sufficient to say that the western part of Abyssinia upon which I am now able to report to the civilized intelligence is a beautiful region, quite as attractive as any of the already known portions of the Abyssinian plateau.

As to the peoples met with, they were the Somali, already familiar to travelers; Abyssinians, about whom much has been said and of whom I shall give some of my impressions; the subservient Galla, the Agaa, the Shankali, the Sudanese, and the Shinasha, a small but interesting tribe, unknown, I believe, until this journey was made.

The great part which the Sudanese have played in the drama of modern Egyptian history is already known.

The Somali is not likely to attract the world's attention in any great degree, as he is now quietly subject to a British protectorate in the country back from the Berbera and Zeila coast and to a French protectorate in the small region around Jibuti. There are, perhaps, not more than half a million, and many of these are becoming more or less civilized by reason of the influence of the coast towns.

What struck me particularly in British Somali Land was the fact that three Englishmen constituted the whole white force engaged in the business of this protectorate. There are some East Indian assistants and a few East Indian troops, thirty-five or forty in all. There are some Greek, Armenian, and East Indian merchants in Berbera and Zeila. The control seems to be largely a moral one, so far as direct influence is concerned, based on a clever handling of the tribal chiefs, who are kept in the coast towns as "justices of the peace," but in reality as hostages.

MENELEK.

Of the Abyssinians, Menelek is the greatest, not because he is the king, but he is the king because he is the greatest. He is emperor of the Abyssinians by virtue of having conquered a great many difficulties, most of which yielded only to the sword or rifle. He is not of that pure Semitic stock which some thousands of years ago seems to have come over first and to have later received reinforcements, from time to time, across the Red Sea from Arabia, and even from Judea. His father was of a kingly family that professes to trace its ancestry to a union between Solomon and the Queen of Sheba. Our accepted authorities in respect to Solomon do not mention this particular *amour*, but that may have been merely overlooked by time.

Menelek's mother was a woman of low origin, and it may be that this cross-ancestry, while depriving him of the pure, finely chiseled facial type which many of his nobles have, and giving him the negroid face instead, may have added something of vigor, since we know that to be too pure-blooded means sometimes to be thin-blooded. One may fairly say that, while having the advantage of noble paternity, Menelek has fairly fought his way to power.

He is eagerly curious to see all new things that Europeans have painfully

brought up to his court, five hundred miles by caravan; yet, of course, he cannot make use understandingly of more than a few. I remember when first presented to him, as he sat in a doorway of the largest room in his residence, a rather confused mass of presents; Sèvres vases from the French Government, phonograph boxes, sextants, and such objects were piled up behind him. He received me by appointment, through Colonel Harrington, who with his assistant, Mr. Baird, had given me the hospitality of their compound. The black, kindly face indicated patience as well as strength, and his manner was that of quiet dignity.

Following the well-established custom, I had with me a few gifts to present to His Majesty, who had sent me goats, bread, and tej. Two large volumes, with illustrations of scenes of our own country, of its cities, mountains, waterfalls, etc., I offered in the hope of making known the land of the free. Through the very excellent interpretation of a young Abyssinian attached to the British agency, I endeavored to explain the geographical relations of the United States to the rest of the world, but I am quite sure that I did not make a brilliant success. The difference in time between New York, which I mentioned as being our biggest city, and Addis Abeba seemed to interest His Majesty very much, but not understandingly.

Menelek seemed to have some appreciation of the magnitude of the Brooklyn Bridge and of the Capitol, yet the absence in his own language of any defined measure of distance left me doubtful as to whether, in spite of his unceasing efforts to understand things European, he is really able to mentally interpret such great dimensions. He has never seen a house larger than his own, unless possibly the neglected ruins of a considerable building erected by the Portuguese about 300 years ago in Gondar, once Abyssinia's capital.

As the Abyssinian is unable to make anything save the round hut, the royal residence was built by East Indian carpenters of rails wottled together and more or less heavily covered with mud, the roof being straw and mud thatch. This palace or Gébi might pass for a fairly comfortable country house, shabby for want of paint. Nor has Menelek ever seen a boat, save the sections of one of poor Marchand's little flotilla lying covered up in front of the Gébi hundreds of miles from any navigable water, telling in its mute, sad way of Fashoda, that well-known story of bravery and blundering.

What I most relied upon as clinching in the royal mind a tolerably defined idea of our country were the pictures of some of our cotton-manufacturing establishments in New England. This I described as the place where were manufactured practically all the cotton goods which constitute the clothing of all of his most advanced subjects. I had noted with surprise and pleasure in Aden, Zeila, and Harar that American cotton goods were the only cotton goods in evidence.

Referring to a map, I further explained that another English-speaking country lies to our north, and that this country was a part of Great Britain's empire. So far as my object of instruction was concerned, I think in this point I overdid it. This reference to Canada, with my statement that all the people in my country spoke English, coupled with the fact that I came in a certain sense under the wing of Colonel Harrington and accompanied by his interpreter, evidently left a blurred impression of my relation to the American eagle. At any rate, when finally written permission was given to me to go into the unknown country to the northwest, I was described as Mr. Crosby, *the Englishman*.

The Emperor was clad in modest, even severe, garb, the chief vestment being

a black-silk burnous. He wore stockings, but no shoes. A tightly drawn turban covered what is said to be a well-developed baldness. Menelek is a hard-working ruler, rising at three or four o'clock in the morning to receive reports that have come in by mule courier from various sections of his empire and to dictate responses.

He is said to be unable to write, and perhaps would consider it undignified to use the art if he possessed it. Till nine o'clock in the morning he is busy with his dispatches, and, it may surprise Americans to know, conducts business with Harar, his most important town, about 200 miles away, by a telephone.

There is nothing more bizarre than to find a long-distance telephone line in this kingdom, which is, so far as mechanical arts are concerned, very benighted; yet as one follows the main highway of the kingdom by toiling over mountain trails, which almost defy even the patient mule, one scarcely loses sight for a distance of nearly 200 miles of the familiar telephone pole. This is the work of a few enterprising Frenchmen, the same who are at the head of the Jibuti Railway enterprise, aided by a Swiss, M. Ihlg, who has been the right hand of Menelek for something like twenty years.

How much there is of the commercial, how much of the political element in this extraordinary work of these Frenchmen, I do not venture to say. They undoubtedly appear to Menelek as the chief interpreters of all the glories of our mechanical civilization. His army is supplied with their rifles and cartridges, and may the day be long distant when these French-made bullets shall be directed against European troops of whatever nationality.

After nine o'clock Menelek is ready to receive those of his subjects, great or small, who claim access to him, and also the occasional European who travels to this strange mud-hut capital. He has learned that there are some costumes appropriate to ceremonial occasions, and out of respect to this knowledge I had been advised by Sir Rennell Rodd to take a dress suit for presentation to the court, and this I donned at nine in the morning and in it rode the mile and a half or two miles separating the British compound from the Gébi.

When these visits have been completed Menelek gives much detailed attention to the buildings and the meager workshops which his East Indian employés have set up for him.

His capital city contains huts, large and small, which may lodge a population of about ten thousand. A considerable part of this city is still of canvas.

The extremely cold nights, with a temperature sometimes as low as forty degrees Fahrenheit, after a day of one hundred degrees in the shade, have caused the Abyssinian on this high plateau to want some shelter.

My Somali servants, who suffered far more than the plateau people, were with difficulty forced to put up tents which I had provided for them, their life-long habit of sleeping in the open air being hard to break.

The difficulty of obtaining firewood will probably necessitate the moving of the capital within the next fifteen or twenty years. As there are no roads, a wheeled vehicle being unknown, firewood must be brought in by hand from the surrounding forests; and as the nearby timber is destroyed, this difficulty will soon become one of great moment.

Several deep ravines cut the town into three or four sections, and in the rainy season these sections are permanently separated from each other, bridges not being attempted.

In the whole kingdom I think there are three permanent bridges. One of these is over the Hawash, which must be crossed in order to reach Harar and the coast. This bridge was built under

the direction of M. Ihlg. Two other bridges, of stone, one of which I crossed north of the Blue Nile, were constructed years ago under the direction of some Greek priest.

The Abyssinian seems quite unable to follow the lead of any such work and is capable of only the most rudimentary accomplishments in mechanical arts; he can work a pretty good saddle of wood, he fashions a fair piece of metal into a sort of spear, and he can make, as already described, a tolerably tight hut, without a chimney, and weave a loose, rather comfortable, cotton or woolen garment.

The paltry ornaments which are found in the market places are not better than many that some of the typical African tribes can make.

Nevertheless the pure-blooded Abyssinian shows his Arabic origin, as, in spite of this very low development in the mechanical arts, he stands head and shoulders above all ordinary African people in the development of his language and his religious ideas.

Except when dealing with the black tribes whom he has subjected, Menelek carries on the business of his government by written orders in the Amharic language, the common spoken medium. It is of Semitic derivation, as is also the language of their holy books, now extinct save in some remote parts of the province of Tigré. This ancient language is known as Geez, and in it those books of the Bible with which they are most familiar are preserved. It is to be remembered that these people were Christians when our forefathers were painted blue and worshipped Thor and Woden. A shipwrecked priest from Alexandria somehow made an easy convert of the reigning king about the year 330 A. D.

The country is dotted with big round mud huts, which are churches. The priestly order, although vastly ignorant, is not without power. They inculcate, doubtless in good faith, many superstitions, but with it all are firm believers in the principal tenets of the Christian doctrine.

I found by inquiring of a priest in a small far-away village that he was unable to read the sacred books which he sold to me. He said that was the business of the high priest.

Rude paintings are found on the partitions inside the churches, representing various saints, cheek by jowl with such dignitaries of the Abyssinian social order as had contributed to the making of the church. The artists are not typical Abyssinians. In considerable part, so I was told, the work of the churches is done by the Falasha, remnants of a Jewish tribe still stubbornly living apart and maintaining the Jewish creed and considering themselves defiled by conversation with Abyssinians.

No one can doubt that Jewish influence was at one time very great in this territory, and it seems to me highly probable that Frumentius, who converted the Abyssinians to Christianity, may have found his task the easier because of some perverted knowledge of the Jewish prophets.

At a later date, about the year 1000, a Jewish princess, Judith by name, established her family on the throne, which held sway for something like 200 years.

Altogether it may be said that the origin of the Abyssinian people fully warrants the Arabic word "Habeshi," from which we have our word "Abyssinia," and which means mixed.

It is possible that before the Semitic invaders settled in this fertile land some small influence from the great Egyptian civilization around the mouth of the Nile had been pushed up and up along the stream, through the desert, to where it must have been merged with the native element, presumably black, then holding the soil. I feel convinced that this influence must have been small, because of the very great difficulty with which in-

tercourse could have been maintained between this upper region and lower Egypt. For a thousand years the Abyssinians were cut off from the rest of the world, and maintained the Christian doctrine as implanted by Frumentius.

Then came a period of contact with the Church of Rome, through the efforts of Portuguese missionaries and soldiers, at a time when that brave little kingdom sent its intrepid sons to every quarter of the globe. This missionary effort, however, added a very bloody chapter to the history of Abyssinia, and finally all white men were expelled, and again the gates were closed, and a period of something like 150 years elapsed before any further knowledge was had of things Abyssinian.

Since that time travelers have given very complete accounts of the country and its people; the touch with Europe has been again made intimate and bloody, through the efforts of the Italians to extend their power over Abyssinia.

This effort closed in the terrible tragedy at Adowa, where the flower of the Italian army was destroyed by Menelek's hosts. In spite of the errors, which it is easy now to mark, in the conduct of the Italian army, I feel very strongly that the Adowa campaign must have more nearly represented the probable outcome of any other European effort against united Abyssinia than did the Magdala campaign which the British conducted in 1867. Theodore, the emperor, after years of factional strife, was bereft of nearly all his followers when a British force, consisting of 13,000 men and 7,000 camp-followers, took, without the loss of a single life in action, the stronghold in which he had been left by his own people.

Attached now to the British agency as a sort of pensioner is a certain Irishman, wholly Abyssinianized, who was one of the servants of these imprisoned officers whom the great army at Magdala released. He was pointed out to me by Colonel Harrington as representing something like £2,000,000 to the British Government, that being the *pro rata* cost of saving the lives of Theodore's captives. He cannot be disposed of at cost price.

Due to the trouble which the white man seems to have brought into his country, Menelek has been, for one so eager to tread the path of civilization, rather slow to give permanent hold to white interests. The concession to the railway people was a marked departure, and subsequently the concession to some English mining people for work in western Abyssinia marks another step toward progress and national destruction.

Menelek is indeed at the parting of the ways, and all the while is earnestly seeking the betterment of his people as well as his own glory. I believe he is leading them to the brink of destruction. Such are the ways of the Omnipotent in bringing about the spread of what we call civilization, to drink of whose cup is to the barbarian to drink of poison. What will happen when Menelek dies, nobody knows. If some strong man of the "Abyssinia-for-the-Abyssinians" variety can grasp the reins, the autonomy of the country may yet be maintained for a long while, and together with it the ignorance of the people.

Their Christianity sits upon them lightly, as I found, for example, in respect to the institution of polygamy.

Menelek himself sets an example of monogamy, having one wife, who is a woman of considerable influence and of very good heart. But many others have not received that part of the Christian doctrine which forbids more than one wife and live more or less happily with several wives in the same household.

SLAVERY IN WESTERN ABYSSINIA.

In respect to polygamy's monster twin, namely, slavery, many of the Abyssinians are quite ready themselves

to capture slaves from the inferior and more lowly developed tribes as well as to hold them in slavery when caught by some one else. Theoretically, there is no slave trade in Abyssinia, and in fact it is pretty well controlled. In the region which I traversed, where no whites had preceded me, there were still one or two slave markets, and I rather expected to see the trade going on openly; but Menelek's lieutenants know that he has engaged with European powers to put down the slave trade. They were therefore surprised that I had been permitted to enter that part of the kingdom where the traffic is still maintained.

When I asked where I could buy two or three boys, one of the chiefs, who had escorted me for several days, good naturedly said, "You white people have stopped that, but," he said, "there are robbers from whom you may buy on the sly," and indeed at Wombera a small boy was offered at my tent for 37 Maria Theresa dollars, equivalent to about half that sum in our money.

There were, however, no public offerings, although I chanced upon the market day, but the chiefs had, so my interpreter informed me, given orders that no public traffic should take place.

Indeed the presence of a white man on the market ground stampeded the whole performance, not through fear, but through curiosity. There were perhaps three or four hundred people gathered together for bartering, and the whole of them—the last man, woman, and child—arose and followed and pressed upon myself and assistant as we walked about, but apparently with no ill-humor.

The night before the natives had refused to sell us food, but finding no harm come of our presence they changed their tactics and I was able to obtain one chicken and twelve eggs for three blue beads. Eggs are not eaten by the natives. Careful inspection of their stores is therefore necessary.

The next day we met a long caravan of slaves marching up from the country south of the Nile. The caravan seemed to belong to a rather striking-looking woman, who was the wife of a great Abyssinian personage dwelling far to the north. She and her lieutenants had been in Shankali Land and had obtained (by purchase, let us presume) a goodly number of black fellows. These are offered for sale by some bold neighbor or relative. Where these slaves were seen by me in service around Monkorer, which is a considerable town, and in the smaller villages westward, there was nothing of brutality or special hardship of any kind apparent in their surroundings.

We passed through a section of country not yet thoroughly subdued by the Abyssinians and inhabited sparsely by the very people from whom the slaves were drawn. How far these very low savages prefer the debasement in which nature holds them when free to the conditions created for them by superior masters, I cannot state. The fact is that a wide gap exists between them and their Abyssinian lords, and that the physical surrounding of the Shankali when with the Abyssinian, crude as all that surrounding may seem to us, is far less crude than that which he creates for himself.

Those who finally accept the sovereignty of the Abyssinian are not subject to slave-raiding, but are permitted to live peaceably enough in their own fashion at the expense of some small tribute to the Abyssinian lord.

The dominion of the Abyssinian power is now established as far west as Wombera, where I left the most westerly Abyssinian post and descended to the Nile plains below.

The whole region beyond has been terribly swept by war and slave-trading. It is yet without government, although there is a merely nominal sovereignty claimed by Menelek. As a matter of

fact, each village—and there were two—seemed to stand entirely alone. The people hid away from before my small caravan, and I had very great difficulty in obtaining guides. While in Abyssinian territory these guides had been impressed by force or blows when necessary and at the command of the Abyssinian dignitary who accompanied me.

When I wanted to descend to the gorge of the Nile, the fine old gentleman, who was chief of the region, ordered some of the local natives, Agaa by name, armed only with spears, to go down with me, his own soldiers somehow not wanting to make the venture.

The river bottoms were said to be filled with warlike Shankali, armed with spears and poisoned arrows, and who had been forced to these narrow confines by lack of food, as along the river they could get an occasional hippopotamus and live upon that for a long time. My native escort was absolutely cowardly and got into a blue funk over the few footprints that appeared near the river, and I had to promise to protect them with four of my own men, but insisted that they should show us the way. The Shankali appeared only on the far side of the river, just a few black, naked fellows, who made a great pow-wow, and were evidently wholly unequal to the task of attacking four or five rifles and six or eight spears. Moreover, they were paralyzed, as in every other case in which I met such low people, by the sight of white men.

One village chief, after getting his people around my camp in such numbers as to worry my followers somewhat, but in wholly insufficient numbers to have made any successful trouble with my whole body, which consisted of eighteen well-armed men, finally came down in utmost submission and declared, as nearly as I could make out from the five interpreters arranged in tandem, that I was a god and could eat him up if I chose.

This middle territory will soon be assigned in part to Abyssinia and in part to the Sudan. That part assigned to the Sudanese authority, which means the British, will soon have some new life built out of the remains of a devastation as complete as anything imaginable. The Abyssinian portion will live along its barbaric fashion with some small development.

The status of the black and naked Shankali will be slightly raised, and at least the country will be so well ordered by the power of Abyssinian soldiers that further investigation by white men may in the future be easily carried on there.

But the Abyssinian himself is not, in my judgment, ready for civilization as we measure civilization, though the upper classes already have much of the manner of the polished eastern people without having the material richness that Asiatic civilizations have produced.

The Abyssinian is individually rather an independent, easy-living, battle-loving, raw-meat-eating, sensual, devil-may-care chap; but one must guard against giving any definition or description which shall be taken as universal in its application. This is rendered particularly inappropriate when one recalls the varying types from the well-chiseled Arabic and Jewish down to the coarse negroid caused by all degrees of miscegenation.

Their laziness, their fondness for *backsheesh*, their inaccuracy, and their pride, puffed up by the defeat of the Italians; their ignorance of what we know to be our immense superiority—all this for a time irritates the traveler, but in the end there is left rather a pleasant impression of kindness.

As is generally the case, the Abyssinians who have seen most of Europeans are not those whom Europeans would like most to see

I should be quite willing to trade with bars of salt, which constitute the chief currency from Addis Abeba westward

northward, and southward, or with beads or with empty tin cans, all of which served my purpose in various places, rather than to have the convenience of using the Maria Theresa or the Menelek dollar, which coins are now quite readily taken along the caravan routes from Addis Abeba to the east.

Rather this inconvenience of crude methods, with the greater simplicity and straightforwardness of the untutored native, than the coarse cunning which begins to appear when the native begins to suspect and compete with the superiority of the white man and to truckle only to one thing, namely, *backsheesh*.

THE FUTURE OF ABYSSINIA.

Today Menelek and the Sultan of Morocco control the only two territories independent of actual occupation or diplomatic claim on the part of some European power. As between these powers, this division has been made without bloodshed, and is a notable triumph for diplomacy; and I believe that the European domination of African territories may be counted as blessed, for certainly those territories which have passed beyond the first paroxysms of savage resistance now show larger and more comfortable populations than existed under native rule and misrule. This is not set forth as an apology for the grasping of territories held by lower races, since our ethical standard is not well enough determined for application to these cases, and since, moreover, the grasping continues to take place, whether we count it as right or wrong.

The ultimate determination of the Abyssinian and Morocco territories will put a much more severe strain upon diplomacy than it has yet been called upon to bear in regard to African affairs. The population now in occupancy of the territory is in both cases far above the average of African intelligence, and in one case community of religious form with European countries will tend to complicate the situation, in that the missionary cannot appear so opportunely as a *casus belli*. However, to overcome that difficulty, we may convince ourselves that the Christianity of the Abyssinians is not quite the correct style, and may thus approximate this case to others in which the itching palm is stretched forth as if in prayer.

Here again let me say that it is not my desire to criticise missionary methods. To me, believing, as I do, that the universe is absolutely law-ordered, even to the lifting of a finger, the blood-thirsty missionary appears to be as solemn and as necessary a part of the scheme of the universe as any other part.

Quite as convenient, perhaps even more so, than the missionary as a *casus belli* is the railway—that is, the railway of civilized man laid in barbarian country. Not only may it furnish the cause of war, but it, of course, immensely simplifies the problem of carrying out the war which it may have produced. While the French, together with the English, Italians, and Russians—the four nations which have sent emissaries to Menelek—are doubtless of the firm conviction that this is not the time for war-making, that the enlightened peace of Menelek serves best all purposes which can now be served, it remains that when disorders of any sort arise, if the railway may have then been completed up to the top of the Abyssinian plateau, the French will have obtained a very great advantage for the playing of such part as they may then choose.

An extension of the British-Egyptian Railway up the Nile, now stopping at Khartum, may be made without great difficulty along the route which I followed, and which I pointed out in a paper about to appear in the Journal of the Royal Geographical Society of London. Such extension would practically equate advantages in respect to transpor-

tation, if we consider only a contest between either France or England on the one side and Abyssinia on the other; but if these great Powers were themselves at war, then the naval supremacy of England, operating from a great fortified sub-base such as Aden, would probably control and paralyze the Jibuti terminal of the French railway.

But taxed as is Great Britain now, it does not seem probable that this 500-mile extension will be undertaken at a very early date. So far as the peace of the civilized world and the continued independence of the Abyssinian are concerned, it seems probable that a continuation of the state of unpreparedness on the part both of France and England should serve best these ends of peace. To subsequently maintain at about equal point of advantage the facility which either of these great nations might have for making war upon, with, or through the Abyssinians would prolong the national life of this interesting people, who occupy in barbaric style one of those splendid stretches of the earth's surface which must ever tempt the daring European, driven forth as he is by a blind racial instinct—driven forth to combat and to push away the specter that Malthus raised.

Could you have been with me in marching over the devastation marking the as yet unconquered Bollasa region into the Sudan, where only a few months before the blood of the dying calipha had cemented the foundations of peace; could you have seen there the small but happy beginnings of well-ordered villages and the contented submission of these black and wayward children of the desert and their obedience to the firm, wise rule of the English officer, recalling the unchanging story of almost unending tribal war, you would feel very nearly convinced that, if indeed peace and order be good for the lowly developed peoples of the world, this good will be earliest attained by the sacrifice to some such great policing power as Great Britain of an independence which ever has meant native tyranny.

But we must remember also that disasters which read terror into our blood but furnish in part the needed excitement to give some value to the crustacean lives of these rude people.

Passing one day through the ruins of a village marked by broken pottery vessels and grinding-stones, my grinning guide explained that here he had lived some few years ago; the village had been attacked by Mahdists or slave-traders, he seemed scarcely to know or care which, and he had lost his hut, three wives, and one or two children, himself escaping into the close-pressing bush. "But," said he, with the philosophy which made me poor in his comparison, "I now have another hut, other wives, and other children," and he laughed good-naturedly. Absolutely the only care at that time in the mind of this simple savage was a desire to get loose from the caravan in order that he might return to the hulk of a hippopotamus which I had shot two days before. Could he but secure that black carcass for himself and his small village, life would have no other cares—today, tomorrow, and even next week would be provided for. Could more be asked of Heaven?

THE OLD YUMA TRAIL

By W J McGee

SOME three to seven centuries before Columbus, the country lying south of Gila River, west of the Sierra Madre, and east of the Californian Gulf was occupied by an agricultural people, and the ruins of their villages, the remains of their irrigation works, and the crumbling fortifications of their places of refuge on adjacent hilltops—mute witnesses of the rise and passing of a people—still survive in numbers. The finely wrought fictile ware, shapely stone implements, and obsidian blades from the ruins betoken the culture commonly known as Aztecan or Mexican, or better as Nahuatlan. The location and extent of the house remains, as well as the traces of great acequias, betoken irrigation systems more extensive and successful than those of the Mexicans or Americans of today. The vestiges of temples and plazas combine with the symbolic decoration of the pottery to betoken a complex social organization resting on a religious basis, while the corrals (each with its water hole) in many of the villages, together with some of the pictographs carved on neighboring cliffs, suggest, if they do not attest, that a llama-like animal, the coyote, the turkey, and perhaps other creatures, were domesticated by the villagers. The entrenched refuges ("las trincheras" of the modern Mexicans) are among various indications that the peaceful, pastoral folk were displaced and nearly destroyed by a predatory foe whose ruthless energies were directed against irrigation works as well as against families, farms, and flocks, and the testimony of the ruins is supported by the traditions of surviving tribes, which point to the marauding Apache as the spoilsman—and hence the hereditary enemy—of the plains people. During this early agricultural period the scant waters of the region were where they are now, and were probably little, if any, more abundant than today, though better conserved and distributed by means of represos and low-gradient acequias. The village sites were those selected long after for aboriginal and Mexican pueblos, with a few others never again occupied, while the trails and roads, as they were by watering places and impassable sierras, must have followed lines corresponding with those of later travel. Among the natural routes fixed by water and mountain, and still marked by ruins and smaller relics, was that which long after became the Yuma trail.

THE TIME OF TRADITION.

The ancient lore and modern customs of the Papago Indians tell of descent from the prehistoric irrigators—tell that their tribal ancestors were among the few survivors of the prehistoric pastoral folk who, driven into the deserts too far for foes to follow, were able to adjust themselves to one of the hardest environments in America, to engage in a ceaseless chase for water singularly like the chase for quarry in lower culture, and to produce a unique combination of crop-growing industries with migratory habits.

One of the earliest havens of the ancestral exiles was a meager oasis already occupied by some of them, though divided from the customary Apache range by a hundred miles of waterless desert; here a tiny rivulet, fed by the subterranean seepage from rugged granite

ranges on north and south, trickles permanently over the sands of a broad wash occasionally swept by the freshets following storms in the same mountains; here the refugees began anew the development of tribal character; and here began their unwritten Book of Leviticus, following their Genesis and Exodus in curiously Hebraic order, in their Ancient Sacred Tales. Devotees (like other lowly folk) to the dark mysteries of unstudied nature, they had brought their old faith with them, but enshrined it anew in their second Eden; carrying a cult of the sea—a vestige of littoral life in earlier generations—in which they worshipped the ocean as the infinitely potent Mother of Waters, and finding their faith sharpened fearsomely by the incomparable preciousness of fluid in these outer deserts, they enjoined on their young men pilgrimages to the Gulf at its nearest point as sacramental requisites for entering into the stage and condition of full manhood; bringing seed of maize and beans from ancestral gardens, they not only planted but cherished their crops with a consuming watchfulness growing into actual worship, and finally giving name to both locality and tribe—for oasis and river came to be known as the Place of Corn (Sonoyta, as commonly written), and the tribe as Beans People (papahoaatam).* The habit of eternal vigilance on the part of the Papago of defense or flight, according to the strength of invading parties, led to the placing of outposts as far east of Sonoyta and as near to the Apache range as might be; and eventually a semi-symbolic outpost was established at the most conspicuous and impressive landmark of all Papagueria—Baboquivari Peak. This station was supported partly by shamans armed with magical devices, partly by bold and athletic warriors who could be trusted to traverse the hundred miles of desert to Sonoyta between noon-day suns; and there is traditional evidence that the granite walls of the peak—so lofty and precipitous that but one Caucasian* has scaled them—were climbed and its crest occupied by at least one party of tribesmen. In time Baboquivari became the Sacred Mount of all the Papago; and as the tribe multiplied and flowed feebly back toward the ancestral valleys, the sacramental pilgrimage of the young men was so extended as to cover the 150 miles from Baboquivari to the sea, with Sonoyta as a way station.

A half of the path thus trodden by the Papago pilgrims from some centuries before Columbus up to the beginning of the twentieth century was that retrodden by Caucasians for a century and a third as the Yuma trail.

THE COMING OF THE CAUCASIAN.

The first foreigners to approach the ancient trail were Alvar Nuñez Cabeza de Vaca and his companions (in all, three whites and one black), as they near the end of the most remarkable transcontinental journey in the history of America, in the spring of 1536; three or four years later Coronado's army also approached and perhaps crossed within sight of Baboquivari, and it is practically certain that a detachment of this army actually followed the footsteps and guidance of the Papago pilgrims over a part of the trail. It was in September, 1540, that Captain Melchior Diaz set out from Coronado's headquarters at Corazones (at or near the site of the present Ures) with a force of 25 men in the hope of intercepting Alarçon's fleet on the coast, and so shaped his course as to strike Rio Colorado a little way above its mouth. His route was never mapped, nor even fully described (he lost his life through an accident in the Colorado country); but to one who has traversed the region

* Cf. "Papagueria," THE NATIONAL GEOGRAPHIC MAGAZINE, vol. IX, 1898, p. 345.

* Prof. R. H. Forbes, of the Territorial University of Arizona

in several directions, sifted the local lore of waterpockets in the rocks and coyote-holes in the sandwashes, and traced the routes of both prehistoric and present travel, it seems clear that Diaz' detachment worked northwestward to the Horcacitas and on to Rio San Ignacio, and thence across the plains to Sonoyta, where he must have watered and rested before pushing forward by way of the high waterpockets (Tinajas Altas) to the great "River of Good Guidance" (Rio de Bono Guia, an early name of the Colorado); and it must have been by the same route that the leaderless party returned in January, 1541.

With this expedition the third chapter in the history of the Yuma trail ends abruptly; for, through the most astounding blunder of American geography, the memory of Diaz and the records of Alarcon and his predecessor, Ulloa, dropped out of mind for more than a century and a half, during which the Californias were mapped as a great island in the Pacific.

THE JESUITS AND THEIR SUCCESSORS.

Toward the close of the seventeenth century the era of Jesuit missionizing in Papagueria opened, and not long after Padre Kino and his colleagues struck the tribesmen's trail from Baboquivari to Sonoyta; and it was in 1701 that Kino pushed westward, necessarily by way of Tinajas Altas (which he was the first to map), and rediscovered Rio Colorado, thereby puncturing the bubble of fictitious geography.

The good padres were ideal pioneers; wherever the Indian trails led, there they followed; and wherever an Indian settlement was found, there they erected crosses and sought converts. To them the Place of Corn on the slender rivulet was a fertile field. Some fifteen miles down the sandwash from the principal village they found a smaller settlement gathered about a spring of whitish water seeping from potash-bearing granites, for which they adopted the native name House-ring Spring* (Quitobac), and they set their wooden cross midway between the two settlements and called the place Santo Domingo.

As missionizing proceeded, routes of travel were opened from tribe-range to tribe-range; and in the course of a few decades the hard trail from Culiacan (or Ures, or Chihuahua, or Fronteras) to Santo Domingo, and thence to the Yuma country on the Colorado and on to the missions of California, became an established route of travel and communication. The palmiest days of the Yuma trail rose and set in the century 1740–1840. It was trodden by adventurers too poor to ride, yet too plucky to stay; it was beaten by hoofs bearing churchly equipage and royal commissions and vice-regal reports too precious to be entrusted to the crude craft then plying the Pacific; it was furrowed by the huge hewn-log wheels of Mexican carts carrying families a few miles a day, and later by the iron tires of prairie schooners and primitive stages; its borders were trampled by stock driven out to enrich the distant province of Alta California; and its course was marked by the pitiful milestones of solitary graves, each with its cruciform heap of pebbles. During this period the hard route was dubbed "El Camino del Diablo;" and it formed (alternatively with the easier but much

*The typical Papago house is of hemispherical shape and made of grass thatch attached to a framework of mesquite saplings and akatilla stems; it is called *ki* or *key*. The first stage in building is the erection of a first course of thatch in the form of a vertical ring 12 or 15 feet in diameter; this may be occupied for weeks or months before the upper courses are added to complete the walls and forming the roof; it is called *ki-to*. *Bac* is one of several Papago terms for water or watering place, and is applied specifically to springs. When the missionaries found a larger Papago settlement about a series of mineral springs 30 miles south of Sonoyta, also called Quitobac, they applied a Spanish diminutive to the first found village, and ever since it has been known as Quitobaquito.

longer route by way of Tubac and Tucson) the main overland tributary to "El Camino Real"—The Royal Highway of California.

The Jesuits were expelled in 1767; but the old Yuma trail and the old California missions remained as monuments to their enterprise and as means of later progress.

With the international friction presaging the Mexican war, the importance of the ancient trail began to wane; with the treaty of Guadalupe Hidalgo in 1848 our own argonauts cast their eyes toward the far-rumored overland route, and with the gold fever of Forty-nine the activity along the fitly named Camino del Diablo waxed again temporarily. The sharing of its miseries by American and Mexican adventurers begot sympathy and mutual understanding, and opened enduring friendships which helped to heal the international breach and obliterate the scars of warfare. Yet the transitional epoch was not without painful episodes; the Crabb filibustering expedition struck the historic trail on their way *via* Sonoyta, to be annihilated at Caborca (where the old church still bears bullet-marks of the battle); tradition tells of an immigrant colony from Mexico to California following the ancient way to Tinajas Altas, where they were halted by an evil conjunction of epidemic with international complications to fill literal scores of graves still dotting the barren footslopes of the dazzling sierra; and equally stirring events still live in the memories of all older Arizonians and Sonorenses.

It was during the gold-fever renaissance that the death-roll of El Camino del Diablo became most appalling, for many of the travelers were fresh from humid lands, knew naught of the deceptive mirage or the ever-hovering thirst-craze of the desert, and pressed out on the sand wastes without needful preparation. The roll will never be written in full, since most of the unfortunates left no records, scores leaving no sign save bleaching bones; but observers estimate that there were 400 victims of thirst between Altar and Yuma within eight years, an estimate which so conservative a traveler as Captain Gaillard thought fair after he had "counted sixty-five graves in a single day's ride of a little over thirty miles."

THE BOUNDARY SURVEYS.

With the Gadsden purchase of 1853, the boundary surveys already under way received fresh impetus, while the belated argonauts still trying all possible paths toward the new territory, whose name was synonymous with gold for a generation, were once more tempted southward. So, even before the survey reports were published the fame of the route spread widely; stories of hard marches over the malpais stretching out from the volcano of Pinacate, of the miring of outfits in the bottomless mud of Tule valley in springtime, of wagons clogged in shifting sands, of desperate night marches under the sharp goads of thirst and hunger, of rescues of thirst-crazed waifs, of burials of the bodies and distributions of the goods of less fortunate parties—these and other heart-rending recitals were whispered afar, or penned in friendly letters, to color the lore of America's most energetic pioneering and filter meagerly (far too meagerly for full history) into literature. The ill-repute of the trail gradually diverted the overland travel to more northerly routes, and when the Southern Pacific Railway pushed over the arid zone in the seventies the old route was finally deserted, save by Papago pilgrims in the sacramental journeys still pursued, and by rare prospectors or hunters.

The final chapter in the history of the Yuma trail touches only the retraversing of the route (after sixteen years without the passage of a vehicle) by the International Boundary Commission of

1891–1896, and the erection of the most serviceable series of international boundary monuments on the western hemisphere—massive pillars of cast iron or solid pyramids of cement-laid stone—each so located that the next monument and the intervening country in either direction can be seen from its site, while the position of each is established with respect to neighboring natural features by published photographs. The boundary party was of men well known throughout both countries; the American commissioners, Colonel Barlow, Captain Gaillard, and Astronomer Mosman, like the naturalist, Dr. Mearns, were chosen on account of previous achievements, while the Mexican commissioners, Señores Blanco, Gama, and Puga, were equally eminent representatives of the sister republic. A report worthy to serve as a model for future commissions, accompanied by an ample atlas and a portfolio of photo-mechanically faithful portraits of the plains and mountains intersected by the boundary, has been published within a few months, while one of the clearest pictures of the arid region ever drawn is Captain Gaillard's "Perils and Wonders of a True Desert."*

The wheel ruts and mule tracks left by the party seven years ago are still plain along the trail, save where obliterated by sand-drifts; even the tent-pegs, ash-heaps, half rusted cans, and empty pickle bottles still attest the arduous work and frugal fare of the commissioners and their colaborers; for one of the characteristics of the desert is the extreme sluggishness of surface-changing processes, a sluggishness hard to realize by those who dwell in humid lands.

After the passing of the boundary parties, the old trail remained untrodden from Quitobaquito westward, except by a road supervisor erecting guide-posts in the portion lying within Yuma County, and by three horsemen (an American, a Mexican, and an Indian) in other portions, until November, 1900, when it was struck by an expedition of the Bureau of American Ethnology.

Such, in brief, is the history of one of the most striking and picturesque routes of travel on the continent. Trodden first in a prehistoric period known only through crumbling ruins, then followed for half a millennium or more in votive journeys of Papago tribesmen—the Bedouin of America—it was traced by Spaniards long before the landings on James' island and on Plymouth Rock. Adopted by evangelists two centuries ago, it soon became a line of pioneering, a highway of colonization, an artery of royal communication; next it was thronged by the indomitable army of argonauts on their way to open a new world on the shores of the Pacific, and later it lapsed into utter desert, than which there is none more forbidding in America.

*The Cosmopolitan, October, 1896, pp. 592–605.

To be concluded in the April number.

THE SEA FOGS OF SAN FRANCISCO*

FROM May to September little rain falls in San Francisco, but every afternoon great banks of fog march in from the Pacific and enwrap the houses, streets, and hills in their dense folds. Ocean fogs as a rule form when cool air flows over warm moist surfaces; but in the case of the San Francisco sea fogs these conditions are reversed, for the ocean surface temperature is 55° Fahrenheit, while the air temperature may reach 80°. Another explanation, therefore, of the cause of these fogs must be sought.

A glance at the map (not reproduced) shows how ocean, bay, mountain, and foothills are crowded together. East of San Francisco stretches a valley 450 miles long and 50 miles wide and level as a table. In this valley the afternoon temperature in summer is usually 100° or over. The valley is connected by a narrow water passage, the Golden Gate, with the Pacific Ocean, the mean temperature of whose waters is in this locality about 55°. Thus within a distance of 50 miles in a horizontal direction there is frequently a difference of 50 degrees in temperature. At the same time in a vertical direction there is often a difference of 30 degrees in an elevation of half a mile. Well-marked air currents, drafts, and counter-drafts are therefore prevalent

The prevailing surface air currents at this season of the year are strong westerly currents, but high bluffs, ridges, and headlands intercept these winds at such an angle that they are diverted to and pour through the Golden Gate with greatly increased velocity. The result is that both air and water vapor are piled up at this point. Mr. McAdie therefore concludes that the summer afternoon fogs of the San Francisco Bay region are probably due to mixture, rather than to radiation or expansion. They are the result of sharp temperature contrasts at the boundaries of air currents having different temperatures, humidities, and velocities. In originating and directing these air currents the peculiar contours of the land also play an important part.

The fog outside the Heads may extend over an area 10 miles square and reaches to a height of about half a mile. If it were solidly packed its bulk would thus be 50 cubic miles. As a cubic foot of the fog at its average dew-point temperature, 51° F., weighs 4.222 grains, a fair estimate of its total weight, allowing for wide swaths or channels fog free, is 1,000,000 tons. This immense volume is carried through the Golden Gate by westerly winds blowing 22 miles an hour, from 1 to 5 p. m. on summer afternoons.

The United States Weather Bureau maintains a station on Mt. Tamalpais, which is about half a mile above sea-level and thus above the fog, another in the city of San Francisco, where the fog converges, and a third station at Point Reyes, the center of origin of the fog. Mt. Tamalpais is about 25 miles from Point Reyes and 10 miles from San Francisco.

The differences in the temperature and humidity of these three stations is most marked. The highest temperature recorded on the mountain during the year 1899 was 96°, on July 18; the maximum temperature on the same day at San Francisco was 66°, and at Point Reyes 52°. That is, on the mountain it was 30 degrees hotter than in the city and 44 degrees hotter than at Point Reyes. The mean annual temperature of the three stations is, however, about the same for all, 55°, which is also the

*An abstract of a paper contributed to the *Monthly Weather Review* for November, 1900, by Alexander G. McAdie, forecast official of the U. S. Weather Bureau at San Francisco.

Figure 1.—Morning Fog over Valleys.

View from U. S. Weather Bureau Observatory, Mount Tamalpais.

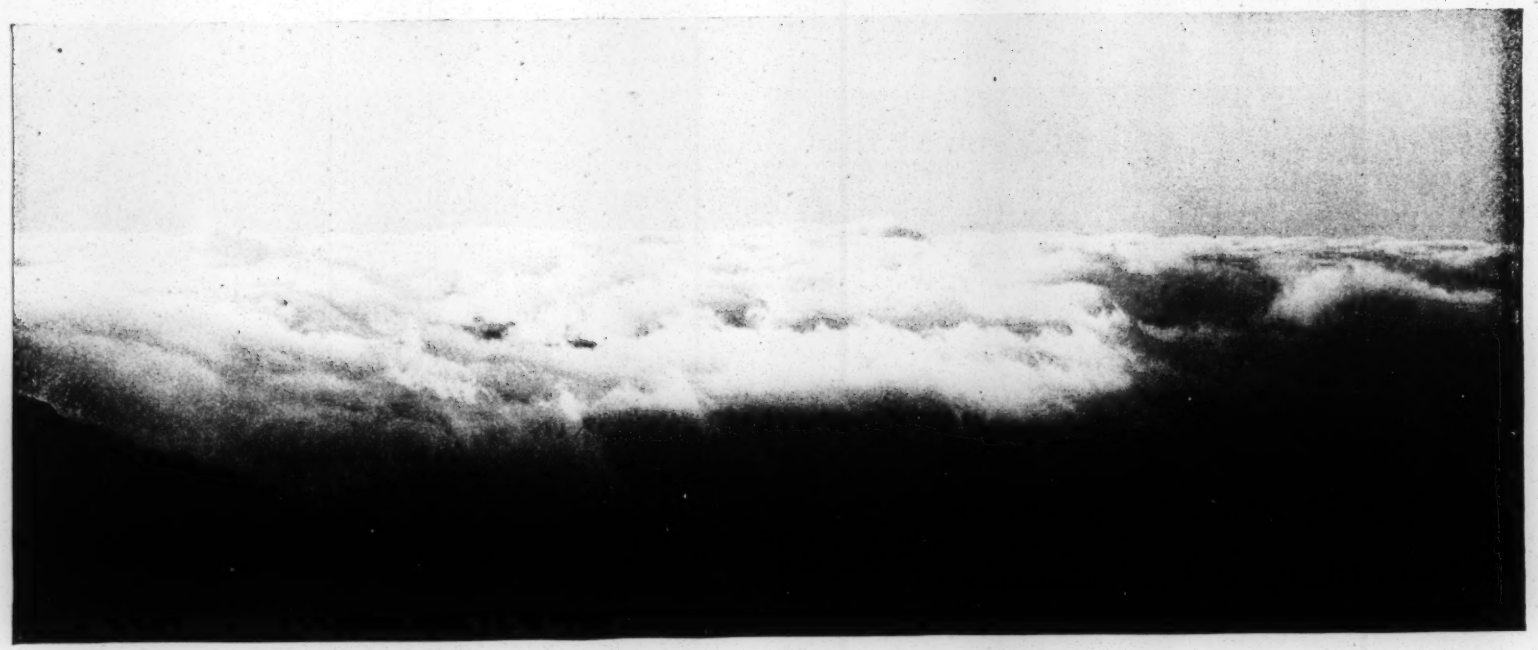


Figure 2.—Lifted Fog. Height above ground about 500 meters.

View from U. S. Weather Bureau Observatory, Mount Tamalpais.

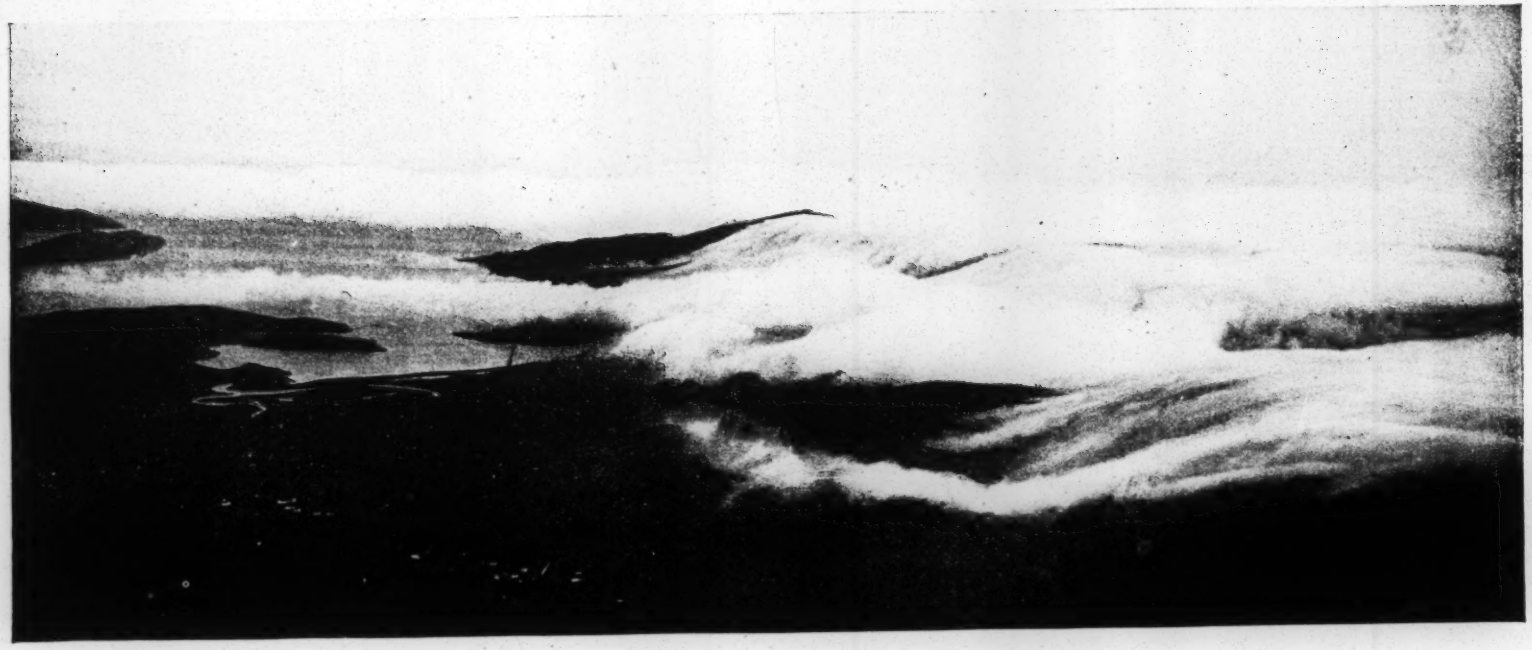


Figure 3.—Summer Sea Fog pouring over Sausalito Hills and through Golden Gate.

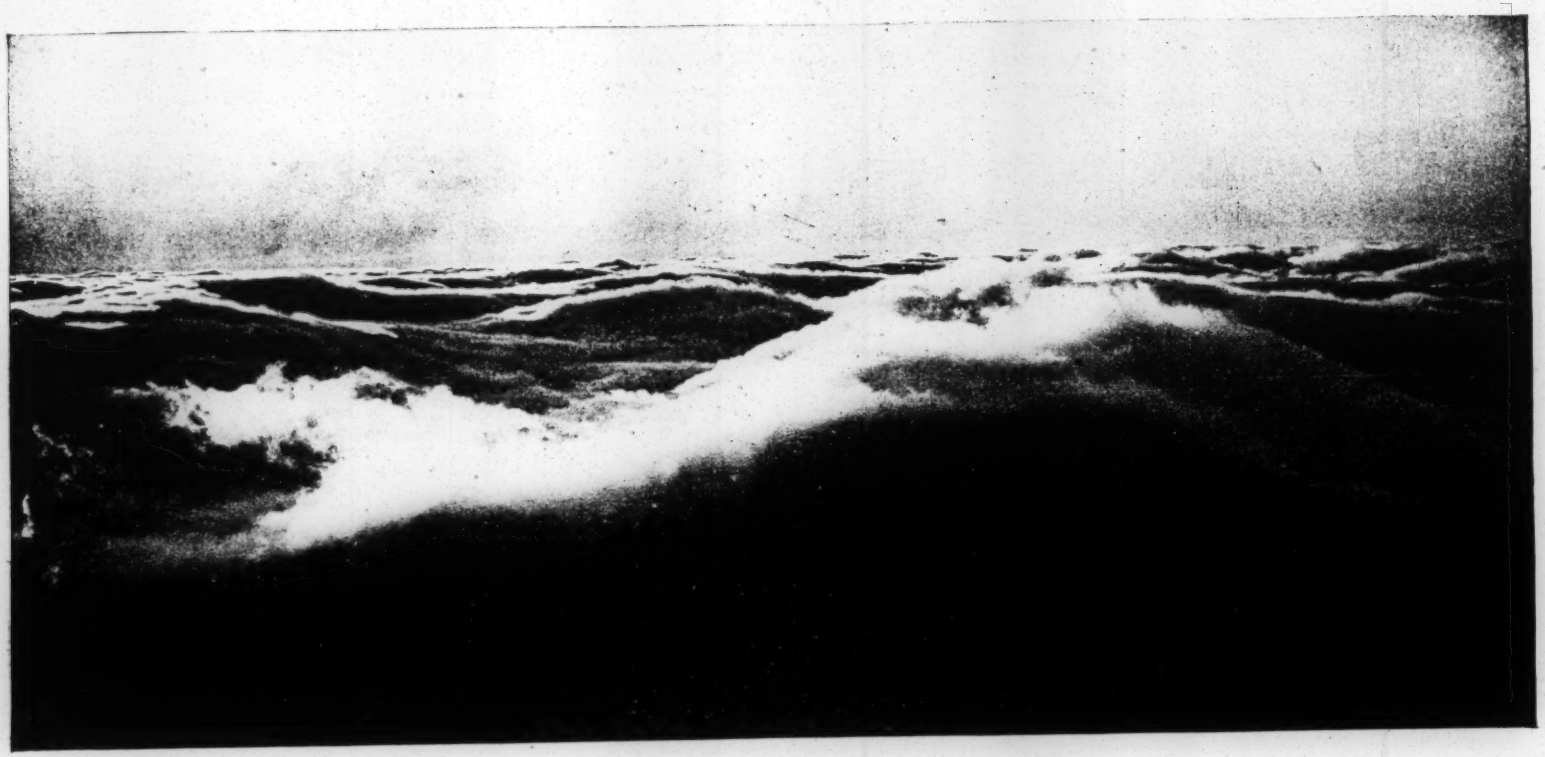


Figure 4.—Fog Waves.

View from U. S. Weather Bureau Observatory, Mount Tamalpais.

Figure 5.—Fog Billow.

View from U. S. Weather Bureau Observatory, Mount Tamalpais.

mean annual temperature of the ocean in the vicinity of the city. During the summer months, owing to the fog, there is usually a cooling of at least 11 degrees at the lower stations; but in winter naturally these conditions are reversed, the temperature near the sea remaining higher than on the mountain. The mean relative humidity at the station on Mt. Tamalpais was 59 per cent, while that at San Francisco was as high as 83 per cent. The average hourly wind velocity for the higher station is also much greater than that of the lower station, the maximum velocities recorded being respectively 91 and 47, and about this proportion is maintained throughout the year.

The Weather Bureau officials in the city receive frequent reports from Point Reyes and Mt. Tamalpais, and thus are able to issue a daily chart showing the extent and character of the sea fog over Drakes Bay, the roadstead, and the Golden Gate.

From Mt. Tamalpais Mr. McAdie has made a special study of fog conditions. His method of obtaining a cross-section of the fog is very ingenious. A descent from the station to sea-level can be made by the train in about fifty minutes, a distance of eight miles. A kite meteorograph is attached near the top of an open-canopied car, insuring good circulation, and carried through the fog in this way a number of times. From the data thus obtained, a rough cross-section is made. A typical pressure distribution accompanying sea fogs has been recognized. In general, a movement southward along the coast of an area of high pressure in summer means fresh northerly winds and high temperatures in the interior of the State, with brisk westerly winds laden with fog on the coast.

The illustrations that accompany this paper depict very graphically the splendor of fog effects. Figure 1 shows the morning fog covering the valleys—the most common type of fog. Figure 2 shows a mass of lifted sea fog in a state of comparative rest. Figure 3 shows the summer sea fog pouring in a mighty torrent through the Golden Gate and submerging the neighboring hills. Figures 4 and 5 show the great billows of the wind-driven sea of fog.

To Prof. Cleveland Abbe, editor of the *Monthly Weather Review*, and to Mr. Alexander G. McAdie, of San Francisco, the NATIONAL GEOGRAPHIC MAGAZINE is indebted for the photographs.

GEOGRAPHIC FACTS FROM REPORT OF THE TAFT PHILIPPINE COMMISSION

THE total amount of land in the Philippine Islands is approximately 73,345,415 acres. Of this amount it is estimated that about 4,940,000 acres are owned by individuals, leaving in public lands 68,405,415 acres.* The land has not been surveyed, and these are merely estimates. Of the public lands, there is about twice or three times as much forest land as there is waste land. The land is most fertile and for the greater part naturally irrigated. There was a very great demand for this land, but owing to the irregularities, frauds, and delays in the Spanish system, the natives generally abandoned efforts to secure a good title, and contented themselves with remaining

* The religious orders own about 400,000 acres.

on the land as simple squatters, subject to eviction by the State. In 1894 the Minister for the Colonies reported to the Queen of Spain that there were about 200,000 squatters on the public lands, but it is thought by employees in the forestry bureau, who have been in a position to know, that there are fully double that number. In the various islands of the archipelago the proportion of private land to public land is about as stated above, except in Mindanao, Mindoro, and Palawan, where the proportion of public land is far greater.

The insufficient character of the public-land system under the Spanish Government in these islands makes it unnecessary to refer in detail to what that system was. As there were no surveys of any importance whatever, the first thing to be done in establishing a public-land system is to have the public lands accurately surveyed. This is a work of years, but it is thought that a system of the laws of public lands can be inaugurated without waiting until the survey is completed. Large amounts of American capital are only awaiting the opportunity to invest in the rich agricultural field which may here be developed. In view of the decision that the military government has no power to part with the public land belonging to the United States, and that that power rests alone in Congress, it becomes very essential, to assist the development of these islands and their prosperity, that Congressional authority be vested in the government of the islands to adopt a proper public-land system, and to sell the land upon proper terms.

MINERAL WEALTH AND THE MINING INDUSTRY.

It is difficult at the present time to make any accurate general statement as regards the mineral resources of the Philippine Islands. There has never been any mining, properly so called, in this archipelago up to the present time. The mining fields have never been thoroughly prospected, and even where very valuable deposits were known to exist they were worked, if at all, in a haphazard and intermittent fashion.

Present indications are that the near future will bring a great change in the mining industry. According to the chief of the mining bureau there are now some twelve hundred prospectors and practical miners scattered through the different islands of the archipelago. Of these probably 90 per cent are Americans. They are for the most part men of good character. They are pushing their way into the more inaccessible regions, furnishing their own protection, and doing prospecting of a sort and to an extent never before paralleled in the history of the Philippine Islands. The result is that our knowledge of the mineral resources of the group is rapidly increasing. When all due allowance is made for prospectors' exaggerations, it is not too much to say that the work thus far done has demonstrated the existence of many valuable mineral fields. The provinces of Benguet, Lepanto, and Bontoc in particular form a district of very great richness.

In the province of Lepanto, at Mancayan and Suyoc, there are immense deposits of gray copper and copper sulphide, and running through this ore are veins of gold-bearing quartz, which is more or less disintegrated and in places is extremely rich. This copper ore has been assayed, and the claim is made that it runs on the average 8 per cent copper, while gold is often present in considerable quantities. The deposits are so extensive as to seem almost inexhaustible. The Commission has been unable to verify the statements as to the extent and richness of these copper deposits through its own agents, but the authority for them is such that they are believed to be substantially correct.

As early as 1856–'57 two concessions were granted to the Cantabro Philippine Mining Company, and an attempt was made to exploit them and market their product. Rude methods of mining, ruder methods of extracting the metal, and still more rude and primitive methods of transportation, combined with lack of sufficient capital and suitable labor, led to the abandonment of this attempt, and for more than twenty years the property, which in itself is a small claim upon the immense ledge above referred to, has been occupied only to the limited extent required by the Spanish mining laws to prevent the cancellation of the concession. The officer at present in charge of the mining bureau characterizes this deposit as an "undoubted bonanza." The main thing necessary for its exploitation is the opening up of a short line of communication with the coast.

Lignites are known to exist in Luzon, Bataan (the island, not the province), Mindoro, Masbate, Negros, Cebú, Mindanao, and other islands. Some of the deposits are very extensive. As yet they have been worked only at or near the surface.

Testimony is unanimous to the fact that the Philippine coals do not clinker, nor do they soil the boiler tubes to any such extent as do Japanese and Australian coals.

The extensive fields near Bulacacao, in southern Mindoro, are within four to six miles of a harbor which gives safe anchorage throughout the year and which has water deep enough for the largest ocean-going vessels. Some of the Cebú deposits are also conveniently situated with reference to harbor facilities. It is to be confidently expected that the coal will play a very important part in the future development of the archipelago.

The outlook as to gold mines grows more favorable as the operations of prospectors are extended. Modern gold-mining machinery has never been used in the Philippines. Igorrote miners in the Benguet-Lepanto-Bontoc district discard all rock in which there is not visible a considerable quantity of free gold. Prospectors in this region claim to have located very extensive deposits of low-grade, free-milling ore, which will yield large and certain returns as soon as concessions can be secured and machinery put in place. Unless the statements of those who have been working in this region are utterly false, it is true that very valuable deposits have been located, and that extensive operations will be undertaken as soon as claims can be granted and machinery placed. At all events, it is certain that the men who have located these deposits have sufficient faith in them to camp on them and wait month after month for the time to come when they can establish their claims.

Extensive deposits of high-grade iron ore are known to exist, but it would seem that their development must be preceded by the development of the coal fields.

But before any of the mineral resources of the islands can be developed mining laws must be enacted and existing claims settled.

HARBORS AND HIGHWAYS.

As may have been expected, centers of population and comparative wealth are to be found at the seaports and territories contiguous thereto, which are more or less accessible to markets by means of water communication; but these favored localities are limited in area and their facilities for doing business are, with few exceptions, inadequate and unsatisfactory.

Although there are numerous harbors dotting the coast line, there are but few that admit vessels of heavy draft. As a rule, they are not landlocked, and are more or less exposed to the pre-

vailing typhoons, so that there are frequently days, and even weeks during which ships can neither load nor unload.

Large vessels entering the harbor of Manila, having a draft of more than 16 feet, are now compelled to lie two miles or more offshore. Those of less draft than this find entrance into the Pasig River. The bay is so large that it feels the full effects of the winds. The only method by which large vessels anchoring therein can take on or discharge cargo is by lightering. At best, and when the bay is calm, this is a tedious and very expensive process, and during rough weather becomes impossible. Moreover, during the prevalence of typhoons, which are not infrequent, the safety of vessels thus situated is much endangered.

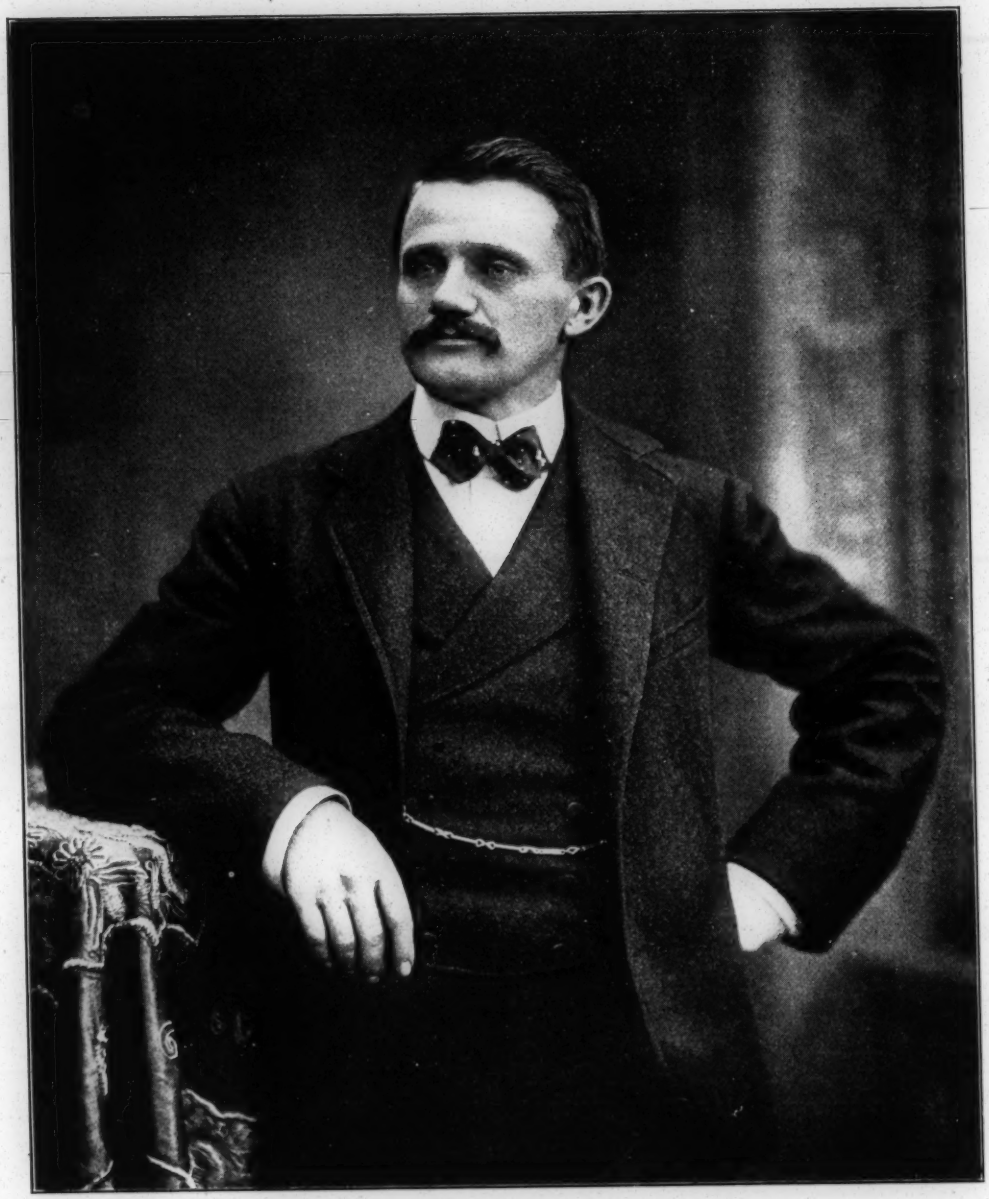
The cost of doing business in this port is very great and constitutes a very heavy burden upon commerce. Freight rates from Manila to Hongkong, a distance of about 700 miles only, are as much and sometimes more than from San Francisco to Hongkong, a distance of about 8,000 miles.

The Spanish Government, more than twenty years ago, formulated an elaborate scheme for the construction of a thoroughly protected harbor, with sufficient depth of water to accommodate the largest ships, and levied a special tax on imports and exports for the purpose of raising the necessary funds to carry it into effect. Operations were begun pursuant thereto shortly thereafter and continued in a slow and intermittent way up to the time of the native outbreak of 1896, with the result that about 30 per cent of the work contemplated was completed. Work upon these plans, with slight modifications, has been resumed by the Commission, which has appropriated $1,000,000 for the purpose.

There are no navigable rivers, roads, or even permanent trails in the islands. There are numerous water-courses in the great islands of Luzon and Mindanao which have their sources in the mountains of the interior and flow to the sea in rapid and broken currents. As a general rule, they are inconsiderable in volume and are either not navigable at all or, if navigable, only for a few miles from their mouths, so that they may be eliminated in considering the question of transportation.

The so-called highways are generally merely rude trails, which in the rainy season, lasting half the year, are simply impassable, and during the dry season are rough and only available for travel to a very limited extent. As a result, there are few natives of the interior who have ever been beyond the boundaries of towns in which they live. The Commission has appropriated $1,000,000 to be expended at once in road-building.

The Manila and Dagupan Railroad is at this time the only line in the entire island. It was constructed by English capitalists and has been in operation since 1892. It has a gauge of 3 feet and 6 inches and traverses a rather low-lying, fertile region, densely populated. It was perhaps improperly located in the beginning, and crossing, as it does, quite a number of streams near their mouths, which necessitated much trestle and bridge work, was expensive to construct. This expense, it seems, was increased by unnecessary requirements of the Spanish Government. As a result, it appears to have cost the company about $60,000 in gold per mile. It is an expensive line to maintain by reason of the fact that several of the streams, in seasons of flood, overflow their banks and inflict much damage upon the roadbed. But, whilst it has not earned a fair interest on the extravagant sum which it cost, it has been wonderfully beneficial in increasing the population and wealth of the provinces through which it runs and affords a striking illustration of the enormous benefits which



Evelyn B. Baldwin,

Leader of the Baldwin-Ziegler North Polar Expedition.

would accrue were railroads built in other sections of these islands.

A line has been projected from Manila eastward and southeastward, running along the shores of Laguna de Bay across the island to a port on Lamon Bay. This port is said to be the best in the islands, landlocked, affording shelter in any weather, and with a depth sufficient to enable vessels of heavy draft to approach close to shore. With this line built, the distance from Manila to the United States would be shortened by about 700 miles. The line would pass through a number of large towns and a rich and fertile country.

THE PHILIPPINE EXHIBIT AT THE PAN-AMERICAN EXPOSITION

By D. O. Noble Hoffmann

WHEN the Pan-American Commission first considered the idea of a Philippine exhibit at the Buffalo Exposition, they were anxious to have on the grounds a typical Filipino village inhabited by genuine natives—men, women, and children. After much conference with the Government at Washington, it was shown that the cost of such an enterprise would be between $150,000 and $175,000, a sum greatly in excess of what would have been necessary in more peaceful times. Accordingly, the plan was declared not feasible. However, the Commission was anxious to have an exhibit of some kind, and declared the sentiment of the people demanded it. Further efforts resulted in the sum of $10,000 being appropriated for the purpose. It was decided that such a sum could only procure purely ethnological specimens, necessitating the barring out of natural history and other subjects. The exhibit thus was made to include what the people of the Philippine Islands make with their own hands or obtain by purchase or exchange.

The management of the money appropriated was placed in the hands of the Smithsonian Institution, which dispatched the late Col. F. F. Hilder to the Philippines to collect the exhibit. His long residence in the Philippine Islands, together with his acquaintance with many of the tribes and their dialects, and his knowledge of the conditions existing in the islands, coupled with his scientific training, served to fit him in a superior degree for this work.

Colonel Hilder certainly did remarkably well under the circumstances, and gathered an amount of valuable material of great interest and importance to the people of the United States. He collected upward of one thousand pieces, illustrating every phase of native life. Every condition and station, every age and sex, every occupation, pastime, and means of warfare, has a place in the collection.

Apparently hats, swords, and canes are the objects upon which the Filipinos bestow the most pride, for there are enough pieces of head-gear of various makes to fill a hatter's shop; enough swords, plain or fancifully carved, to arm a regulation-sized company, and enough canes to stock the stands of a country-fair mountebank.

The swords are of different shapes. They are all sharpened to the nicety of a razor. The bolo is the prevailing weapon. It is very short, for according to an old edict of the Spanish regime the blade could only extend from the wrist to the elbow in length. It is enough to give one an inspiration of fear. It is used also in cutting sugar-cane, etc. The case is of wood and very often merely bound with twine, so that the wielder can strike through if he has not the time to unsheath the sword. The common bolo has a blade of steel, a wooden handle and an iron ferrule, though some have handles of silver and are far richer in appearance and design. One very formidable and beautiful weapon is the Kriss sword. This has a wavy-shaped blade of steel, the handle being of wood wound with native twine.

Passing to articles of more practical use, one of the first to attract attention is the "Luzon," a mortar used by the Tagals as a receptacle in which to loosen the husk from rice grain by pounding with a wooden pestle. It was the universal use of this article that caused the Spaniards to give the island of Luzon its name.

Then there are looms and other native contrivances, showing the manner of making their different cloths—*husi*, *jusi*, *pina*, *cinamay*, etc. These cloths are found in many beautiful colors—pink, violet, orange, yellow, blue, and black—and some are richly embroidered. Every article of domestic use is to be seen—laundry tubs and boards, scrubbing brushes made of half of a cocoanut in the husk, and brooms made of rice straw, and that necessary household article, the back-scratcher, formed of a small piece of cocoanut shell with serrated edge, laced with cotton thread to a long bamboo handle. Very suggestive of the popular song of the day are some samples of *goo-goo* soap bark. This bark is especially adapted for washing the hair, leaving it soft and glossy, and produces thick suds the same as soap. Extreme care must be taken not to let it get into the eyes.

The native hearth is merely a rectangular frame of wood raised on four uprights of squared bamboo; the bottom is formed by a mat of woven splints of bamboo, the whole forming a box-like construction in which has been laid a quantity of hardened earth composition, on which the fire is built. Pieces of this substance in the shape of small elongated cones serve for supporting pots. At the back of the hearth and fastened to the two rear uprights is a piece of bamboo with two long slots and two holes cut entirely through, in which spoons and other utensils are placed when not in use. The three cooking pots with this exhibit are of red earthenware and unique in design. The spoons are each made of cocoanut shell laced to a handle by strips of rattan.

Making the fire on cold mornings is the unpleasant lot of many Americans. However, they ought not to grumble after they have seen the set of fire-making instruments used by the Filipinos and have had explained to them the laborious task of merely making a light. A piece of bamboo with a slit through the middle is placed on any convenient spot, with some bamboo shavings beneath. Another piece of bamboo is then rubbed through the slit at right angles until the shavings smoke, when the shavings are fanned into a flame.

A model of a native cocoanut-oil factory forms one of the most interesting exhibits of the industrial section. The operator sits on a cross-beam and with his feet revolves, by means of two pedals, a little metal shredder, which cuts up the cocoanut. The meat of the cocoanut then moves to a second worker, who crushes it by means of a roller which he rolls back and forth with one hand. The meat thus crushed enters a

press, which not only presses out the milk and oil, but also keeps back the fiber of the shell. When the boat-like receptacle underneath the press is filled with the oil, milk, and water, it is drawn to a fire, where the contents are heated in cauldrons until the oil rises to the surface and is scooped off.

The farmers of the Philippines have their peaceful occupations well represented. One will find at the fair all their agricultural implements and their clumsy, heavy plows and wagons. Their plows are for the most part made entirely of wood, with the exception of the share, which is of iron. The harrow is formed of a number of pieces of bamboo held together by three transverse rods passing through the pieces of bamboo. The teeth are formed of stubs of branches, with cords and yoke attached for one caribou.

The caribou is used in all their farm work and must be quite a tractable animal. The prudent prospective immigrant to the Philippines may gain a suggestion from a caribou sled which is used in muddy weather along the slimy roads and in the rice swamps. This is very unique and will attract much attention and create comment on the weather conditions prevailing in the Island of Luzon.

The Filipino rice reaper is made with a handle of wood in the shape of a hook and a blade of steel fastened on the under side of the grip. In using this implement it is held in the right hand and the hook gathers in the rice while the knife cuts it in one operation.

Farmers will smile when they see a farmer's costume such as is worn by the agricultural class among the Tagals of Luzon. It consists of a shirt of *husi* cloth, a pair of trousers, and a piece of cloth used for carrying articles over the shoulder or on the back.

That nature still supplies the wants of the Filipinos to a great extent is shown by a supply of fishing tackle, nets, seines, shrimp and crab traps. Their fishing boats are called *bancas*. One of the most interesting things in the fishing line is a seashell from Tondo, a fishing point in the suburbs of Manila. The apex of this shell is sawn off to form a mouth-piece, and is used by the fishermen to call assistance when large schools of fish are found.

In the collection there is a milk vender's outfit, such as is used in the cities of the Philippines. The outfit consists of a black earthenware jar hung in a network of rattan partly covered with leather, a wooden shoulder yoke for carrying the jar, a pitcher formed from one section of a large bamboo, with a wooden handle attached by wire, and a measure also formed from a section of bamboo, branded with the inspection and license number of the vender.

Other trades are represented by appropriate exhibits, as the soldering pan and irons and tools of native tinsmiths. The pans are made of heavy earthenware. There is a set of native carpenter's tools; also a native harness-maker's outfit, with samples of tanned leather, a set of blacksmith's tools, and a set of mason's tools.

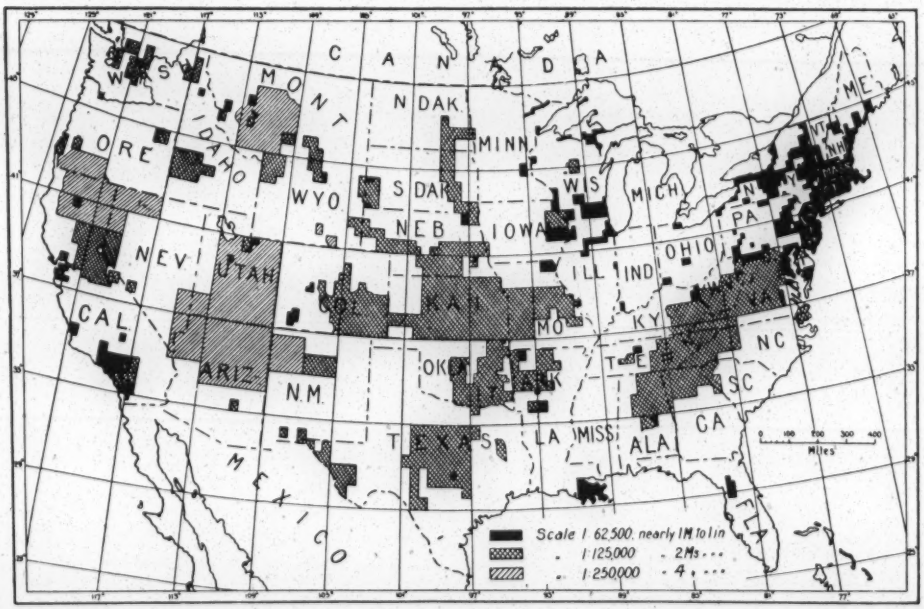
The amusements and forms of recreation of the Filipinos also have a place in the collection. They are evidently a musically inclined people, judging from the gay costumes of a native band of musicians with their instruments—mandolin, flute, guitar, violin, and 'cello. In the musical collection are a beautiful harp made of two kinds of *narras* wood and ebony, and an instrument supposed to be a horn, made from four sections of bamboo, each open at one end and closed at the other. The sections are inserted into one another at right angles and the joints made air-tight with a native gum, the last section being fastened to the main tube by rattan. The horn is held horizontally and played in the same manner as a cornet.

The Filipinos have many forms of amusements, but the greatest of them all is cock-fighting. There is in the Hilder collection a cock-fighter's box, containing four steel gaffs to fasten on the fighting cock's spurs and four leashes to restrict them when not actively engaged. *Pompa cabeza*, a puzzle game, is shown. Natives in nearly every part of Luzon play this game, which is attended with much betting. Roulette wheels and other games of chance are much in vogue throughout the islands, as the collection shows.

Foot ball must be a popular game in the islands, judging by a ball which the Filipino tosses and kicks about. It is somewhat different from our regulation foot ball, being made of a number of strips or splints of rattan tied in the form of a "Turk's head" knot.

Forcible illustrations of Filipino warfare are fifteen cylindrical canisters of native Filipino manufacture, formed of sheets of tin nailed around two circular pieces of wood; they are filled with scraps of iron and fired by insurgents from smooth-bore guns at very short range; and a bamboo cannon bound with wire, captured by United States troops, at Balange Bataan, ou January 5, 1900.

The exhibit comprises much more than can be covered in a brief article. It will prove profitable in giving information as to commercial interests, besides giving new ideas and opinions concerning the Philippines and their people.



GEOGRAPHIC NOTES

TOPOGRAPHIC MAPPING OF THE UNITED STATES.

NEARLY 900,000 square miles, or about 30 per cent, of the area of the United States have been mapped by the experts of the U. S. Geological Survey during the past twenty years. New England, the middle Atlantic States, and small sections of Wisconsin, Iowa, Louisiana, and California have been mapped on the scale of one mile to one inch and their elevations and surface relief expressed by contour lines located at intervals of 5 to 20 feet vertically. Maps of large sections of Kansas, Missouri, Texas, and Virginia have been made on the scale of two miles to an inch and with contour lines indicating vertical intervals of 20 to 100 feet.

Mr. H. M. Wilson, of the Geological Survey, contributes to a recent number of *The Engineering News* an interesting statement of this branch of work of the survey and explains its great practical value. As an example he mentions the case of the city of Waterbury, Conn., which, after spending $10,000 in fruitlessly searching for sources of water supply, learned on consulting the Government topographic maps of a source of good water previously unsuspected. The survey expends nearly $350,000 annually in making these maps. Many States also appropriate large sums to assist the work of the survey in their particular areas. New York, Pennsylvania, Maine, Alabama, and Maryland annually appropriate $75,000 to hurry the completion of the mapping of their territory. The expense of mapping naturally depends upon the character of the country. The cost of mapping an open country is from five to ten dollars a square mile; that of mountainous or forest areas about double or triple that amount.

The results of these surveys are published on sheets approximately 16½ by 20 inches and represent quadrilaterals of 15′ or 30′ of latitude and longitude, according as the scale is one or two miles to the inch.

The atlas sheets can be procured at purely nominal prices on application to the Director of the Geological Survey.

THE GERMAN CENSUS.

THE figures of the last census of Germany reveal some very significant facts relative to the great industrial and agricultural contest that is now being waged in the Empire. The census was taken on December 1, 1900. The growth of the cities, the industrial centers, during the preceding five years has been unprecedented in the history of the Empire. Of the thirty-three cities with a population of over 100,000, every one but Crefeld shows a great increase. Crefeld has decreased by 350, owing probably to the high tariff in the United States on silk goods, which has caused Americans to import only foreign silks of the highest grade. As a result, many hundreds of persons in Crefeld who were formerly employed in the silk factories were thrown out of work. Crefeld manufacturers have now begun to turn their attention to the making of cotton and woolen goods, and it is hoped that the next census will show an increase, not a decrease, in the population. Among the cities which show the largest increase is Berlin, which has added over 207,000, or 12.3 per cent, to the number of her inhabitants, making her present population 1,884,345, not including the suburban cities. Including her suburbs, Berlin numbers 2,500,000.

The city that has increased most rapidly is Nuremberg, which in five years

has added 98,357, or 60 per cent, in a total population of 260,743. This is due largely to the situation of Nuremberg at the point of junction of many highways and of seven railroads. The city of Posen has increased by 42,912 since 1895, largely by the influx of farmers and agricultural people from the country, more especially from Prussia.

Stettin now numbers 209,988 souls, an increase in population of 69,264, owing to its position as the seaport of Berlin.

Hamburg has added 79,117, making a population of 704,069; Munich, 87,502, making a total of 498,503. Leipsic has gained 55,126 in a present population of 455,120, Dresden 58,909 in 305,349, and Frankfort has increased 58,534, making her population 287,813.

These figures show clearly that the Germans are becoming more and more a manufacturing people. The land-owners are becoming alarmed and are even discussing the advisability of importing Chinese to work on their farms.

The population of the empire is 56,345,014, an increase of about four million, or of 7.78 per cent within five years. It is interesting to note that there are nearly a million more females than males, whereas in the United States this proportion is reversed.

EFFECT OF SNOWFALL ON WATER SUPPLY.

SOME very interesting conclusions have been published by the experts of the U. S. Weather Bureau, who have for several years been studying the effect of winter snowfall on the water supply of the succeeding summer. The observations have been confined to the arid regions of the west, more particularly Colorado and Idaho, where the rivers and streams derive their principal water supply from the melting of the snow on the mountains.

The generally prevalent belief that a winter of heavy snowfall is succeeded by swollen streams in spring and summer is not necessarily correct. It is not the quantity of snow that falls during the winter so much as the condition of the soil when winter sets in, the quality of the snow, and the time when it falls, that determine whether streams shall continue full late in the season and furnish abundance of water for irrigating canals. An unusually heavy snowfall in March will certainly be followed by drought in late spring and summer, unless this snow was preceded by a snowfall in the early winter. It is the snow that falls in November and December, and thus becomes packed hard during the winter and melts slowly in the spring and summer, that keeps water in the streams till summer is nearly over. The snow that falls in March and February has no time to become packed and hardened. The first warm breath of spring melts it with a rush, the streams overflow their banks, freshets flood the country for a few days; then gradually the streams subside and a drought ensues.

The issuing of special snow bulletins has been continued this winter by the section directors of the U. S. Weather Bureau in Colorado, Montana, Idaho, Utah, New Mexico, and Wyoming. These bulletins give the average amount of snow on the ground, the amount in the timber line, and the depth of the snow at or near the mountain summits. From their knowledge of the depth, character, and distribution of the snow, the Weather Bureau experts are able to give a reliable general forecast of the water supply for the ensuing season for the different streams of the arid section. The farmer thus learns months in advance the quantity of water his irrigating ditches are likely to receive. The sheep-herder also studies the snow bulletin with profit. In early spring bands of sheep begin to roam the prai-

ries, keeping, of course, close to water. Often the sheep may travel 400 to 600 miles, and by knowing the character and amount of the snow in the mountains, the herder can follow a route where water will be plentiful.

GEOGRAPHIC NAMES.

THE following decisions were made by the United States Board on Geographic Names, February 6, 1901:

Ambrose; the channel across Sandy Hook Bar, New York Harbor, formerly known as East Harbor, was renamed Ambrose Channel by an act of Congress approved June 6, 1900. In that act it is "*Provided*, That the so-called East Channel across Sandy Hook Bar, New York Harbor, for the improvement of which provision was made by the river and harbor act, approved March third, eighteen hundred and ninety-nine, shall hereafter be known as Ambrose Channel" (Statutes at Large, 56th Congress, 1st session, pp. 588 and 627). The name Ambrose is here included *not* as a decision of the Board, but as a decision by Congress.

Conaskonk; point, Monmouth County, New Jersey (not Conaskonck).

Cove City; township, Crawford County, Arkansas (not Core).

Garrett; hill in Middletown, Monmouth County, New Jersey (not Garret nor Garrett's).

Guttenberg; post-office and railroad station, Clayton County, Iowa (not Guttenburg).

Kekurnoi; cape near Cold Bay, Shelikof Strait, Alaska (not Kahurnoi, Nelupaki, nor Nukakalkak).

Kessler; mountain and trianguiation station near Fayetteville, Washington County, Arkansas (not Kestler).

Klahini; river tributary to Burroughs Bay, Behm Canal, southeastern Alaska (not Clahona nor Klaheena).

Leechville; post-office, Beaufort County, North Carolina (not Leachville).

Steele; point, the easternmost point of Hinchinbrook Island, Prince William Sound, Alaska (not Bentinck nor Steel).

Tuttle; lake, Polk County, Wisconsin (not Swahn).

West Point; United States Military Academy, New York (not Westpoint).

CHARTING THE HARBORS OF THE PHILIPPINES.

Preliminary steps have been taken by the U. S. Coast and Geodetic Survey for charting the harbors and coast of the Philippine Islands. A sub-office of the Survey has been established at Manila, in charge of G. R. Putnam, who has a force of men collecting material to assist in the work. In the early spring active work will be commenced and pushed, so that it is hoped that sufficient accurate data will have been obtained by the fall to enable the publication of charts of the larger harbors among the islands. There are no charts of the many minor ports in the islands that serve as points of distribution for the inter-island trade, and these also must be charted.

GEOGRAPHIC LITERATURE

The Century Atlas of the World. Prepared under the superintendence of Benjamin E. Smith. New York: The Century Co., 1899. $7.50.

The Century Atlas, which was first published in 1897, and followed by a second edition in 1899, has doubtless been consulted at various times by every reader of this Magazine. A review or notice of the Atlas would now be superfluous. The publishers, however, have made such a generous proposition to the members of the National Geographic Society, and to the members of one or two other scientific bodies in the United States, that the great value of the work should again be emphasized.

The Atlas was originally published as a separate volume to enable subscribers to the Century Dictionary to complete their sets. Of the edition a few hundred copies remain. These the publishers have offered to members of the National Geographic Society at one-half the original price ($7.50 instead of $15). The Atlas will not be sold separately as soon as these copies are disposed of, and can then be obtained only by purchasing the entire set of 10 volumes that comprise "The Century Dictionary and Cyclopedia."

The Atlas contains 117 double-page maps, 138 inset maps, and 43 historical and astronomical maps. There are nearly 200,000 references to places in the indexes. To each of the principal States two or three maps are allotted, showing all the rivers, lakes, and hills in great detail. Maps of the large cities with their environs are presented, and the harbors of great seaports are also clearly charted. In its foreign maps the Century Atlas excels, the maps of China and the Far East being especially valuable.

Moore's Meteorological Almanac and Weather Guide. By Prof. Willis L. Moore, LL. D., Chief of United States Weather Bureau. With illustrations and 32 charts, pp. 128. Chicago and New York: Rand, McNally & Co., 1901. $0.25.

Unlike the traditional almanac that is crammed with queer statements and queer dates, this little book is a reservoir of reliable information for "the farmer, the horticulturist, the shipper, the mariner, the merchant, the tourist, the health-seeker, and for those who wish to learn the art of weather forecasting."

Perhaps the most interesting and valuable chapter is that on "the construction and the use of the weather map," which explains how an amateur, by consulting the government daily weather chart, can follow the track of storms, and with considerable accuracy forecast the weather. The difference between the cyclone and the tornado, terms usually used as synonymous, is emphasized in another chapter. "The cyclone is a horizontally revolving disk of air covering an area 1,000 to 2,000 miles in diameter, while the tornado is a revolving mass of air of only 100 to 1,000 feet in diameter, and is simply an incident of the cyclone." Prof. Moore states, under the subject of "Protection against Frost," that, in his opinion, with approved appliances, the fruit districts of California and the orange groves of Florida could secure material protection against frost. Other instructive chapters are: "Long-range Forecasts." "The Galveston Hurricane of 1900," "Loss of Life and Property by Lightning," "Weather Bureau Kites," and "Temperatures Injurious to Food Products."

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY

Popular Meetings.

February 1, 1901.—President Graham Bell in the chair. Señor Dr. Don Juan N. Navarro, Mexican Consul General in New York city, delivered an illustrated address, "Mexico of Today."

February 15, 1901.—Vice-President W J McGee in the chair. Mr. Oscar T. Crosby delivered an illustrated address, "Explorations in Abyssinia in 1900."

Technical Meetings.

January 25, 1901.—President Graham Bell in the chair. Prof. Alfred J. Henry, of the United States Weather Bureau, read a paper on the anomalous distribution of rainfall in the Gulf and South Atlantic States during the eleven years 1889–1899. Ordinarily, Professor Henry said, years of fat and lean rainfall follow each other in a very irregular procession. A single dry year may be followed by a second and even a third, but rarely by a fourth. Wet years likewise may occur in groups, but the number of years in a group seldom exceed three.

In the case to which attention was particularly called eleven consecutive dry years were experienced. The annual deficiency at the several stations varied largely. In some years it was not more than 10 per cent of the mean annual fall; in others it was as much as 50 per cent. Happily the mean annual fall in the region referred to is so great that an annual deficit of 50 per cent does not create serious alarm.

Dr. H. C. Frankenfield inquired whether the deficiency in large cities was due to general causes or to steadily growing artificial conditions, such as the increased use of electrical appliances? Professor Henry replied that the deficiency was common to both cities and small towns and even to exposed points on the sea coast. It was probably due in part to a shifting in latitude of the paths of storms and to a diminution in the number of tropical disturbances arising in the Gulf of Mexico or advancing toward the southern coast of the United States from the Caribbean.

Prof. Willis L. Moore called attention to the very great paucity of meteorological records and the exceedingly short time that such records had been continued. We should have, he said, at least a hundred years' observations before we could hope to account for such marked variations as had been described.

Mr. N. H. Darton read a paper entitled "The Powder River Range in Eastern Wyoming." The title of Mr. A. C. Spencer's paper was "A High Plateau in the Copper River Region of Alaska," an interesting description of certain physiographic features of that section of Alaska. In "The Distribution of Trees and Shrubs in Alaska," by F. V. Coville, the speaker traced the zones of plant life in Alaska and gave several possible explanations of the strange absence of vegetation on the Aleutian Islands.

February 8, 1901.—President Graham Bell in the chair. Prof. Frank H. Bigelow read a paper entitled "*The Plateau Barometry of the United States*," the first public announcement of an important work that the Weather Bureau has been prosecuting during the last two years.

The reduction of barometric readings of pressure, taken at the stations on the Rocky Mountain Plateau to the sea-level, has been a problem of special importance to the Weather Bureau, on account of their employment in forming daily weather charts. It is also one

of much scientific difficulty, because of some uncertainty in the elevation of the stations, and the proper temperature argument to be used in making the nec essary reductions. With the lapse of time the necessary observations have accumulated to such an extent that it has become desirable to reduce the entire series taken during the past 30 years to a homogeneous system, with the epoch January 1, 1900. Professor Bigelow has been conducting this research for the past two years, and the work is now approaching completion.

The present investigation has included a complete remodeling of the station elevation data; the reduction of all the pressures to a normal station pressure, which has never been done before, by the application of a system of corrections for elevation, gravity, instrumental error, and diurnal variation; the careful determination of the temperature gradients in latitude, longitude, and altitude; the reduction to sea-level by new tables; the determination of residuals due to local abnormalities, to inaccurate elevations, and to incomplete series of observations, as for those of only a few years' duration, and the further correction of the station pressures to a homogeneous normal system.

This work will also contain normal maps of pressure, temperature, and vapor tension on the three following planes: sea-level, 3,500 feet, and 10,000 feet. From these data it will be practicable, in connection with the gradients obtained from the International Cloud Observatories, to make good daily weather maps on the three planes above mentioned, and thus to provide further means of studying the behavior of storms and the atmospheric circulation generally, at other levels than that of the sea, to which the forecaster is at present confined for his predictions.

Mr. E. C. Barnard presented a plan of work in exploratory surveys.

Announcement of Meetings.

March 1.—"The Recent Famine in India," by Gilson Willetts.

March 15.—"The Two Ends of the Earth: Peary and the North Pole, and the Cruise of the *Belgica* in the Antarctics," by H. L. Bridgman and Frederick A. Cook.

March 29.—"Railways and Waterways of the Russian Empire," by Alexander Hume Ford.

These meetings will be held in the Congregational church, Tenth and G streets northwest, at 8 p. m.

Technical meetings for the reading of papers and for discussion will be held in the hall of the Cosmos Club Friday evenings, March 8 and 23, at 8 p. m.

As previously announced, the subject of the afternoon series of lectures for this year is "The Countries of Asia." The dates and lecturers are as follows:

March 5.—"Western Asia," by Talcott Williams, LL. D., of the *Philadelphia Press.*

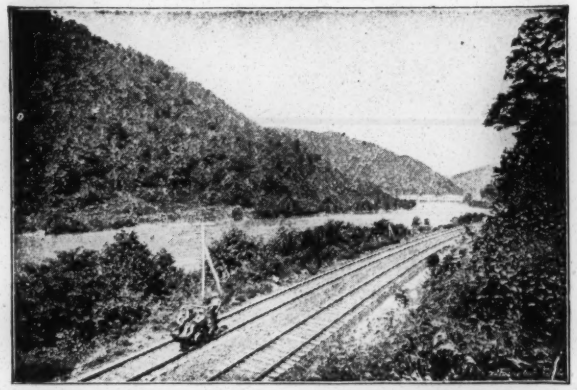
March 12.—"Eastern Asia (China)." Name of lecturer to be announced later.

March 20.—"Southern Asia (India)." Name of lecturer to be announced later.

March 26.—"Northern Asia (Siberia)," by Edwin A. Grosvenor, Professor of Modern Governments in Amherst College.

April 2.—"Asia—The Cradle of Humanity," by W J McGee, Vice-President of the National Geographic Society.

These lectures will be given in the Columbia Theatre, Twelfth and F streets northwest, at 4.20 p. m.



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